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CHILD HEALTH IN HOLLAND, ENGLAND, AND SCOTLAND

SIXTY YEARS OF PROGRESS

BY

CHARLES McNEIL, M.A., M.D., P.R.C.P.Ed.

Edward Clark Professor in Child Life and Health, University of Edinburgh; Paediatrician, Simpson Maternity Pavilion, Royal Infirmary, Edinburgh

The infant death rate is the best measure of the standard of child health in a community; indeed, it is probably the best single measure of the general health standard of a population at all ages. In the last fifty years the infant death rates in Great Britain have fallen rapidly; but this fall has also taken place all over the world; and it is important that, watching our own figures, we should also compare our rate of progress in saving infant lives with that of other countries. In the annual reports of the Registrar-General for Scotland an international list of infant death rates is published: in 1937 England was eighth on the list, Scotland was fifteenth, while Holland shared the first place with New Zealand. In this paper I propose to compare the Dutch infant death rates with our own over a period of sixty years; to discuss the main causes of infant deaths, and the preventive measures, in relation to the present superiority of Holland; and to make general suggestions and proposals for the better control of child health in Britain.

Sixty Years of Infant Death Rates in Holland, England and Wales, and Scotland

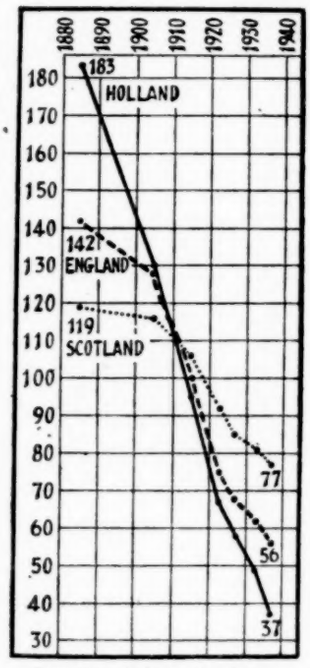

FIG. 1.—Infant death rates per 1,000 live births in Holland, England and Wales, and Scotland, 1880-1938.

Fig. 1 gives the graphs of the infant death rates of Holland, England and Wales, and Scotland from 1880 to 1938. These curves and figures show in detail the remarkable reversal of positions of the three countries over a period of sixty years; and it should be noted that the figures are averages for periods of ten, five, or three years, and not for single years. In the eighties of the last century, when the general level of infant death rates was much higher than to-day, Holland's position was much the worst, England's a good deal better, and Scotland's the best of the three. In the last period, 1936-8, Scotland has the worst position (77 per 1,000 live births), England and Wales (56) are still in the middle, while Holland is easily first with an infant death rate of 37, the lowest of all published national rates for that period.

Year	Holland	England and Wales	Scotland
1880–9 .. 1881–90 ..	183	142	119
1910–19 .. 1911–20 ..	95	100	106
1936–8 ..	37	56	77

International comparisons of figures of this kind have to be made with great caution. Thus in the registration of infant deaths there used to be a practice in Holland and some other European countries of transferring to the list of stillbirths some of the early neonatal deaths, and the effect of this transfer was to reduce the infant death rate. But in Holland since 1924 the differentiation between stillbirths and neonatal deaths has been strict; and the infant death rates of Holland and Great Britain have been accepted by the English and Scottish Registrars-General as comparable in regard to the method of registration of the deaths. So that in the first forty years of the period under survey the Dutch infant death rates were really higher than are shown, and the drop from 1880 to 1938 is even greater than appears.

In discussions on infant deaths, stillbirths are often left out; yet the number of stillbirths is large, and represents a heavy annual loss of infant lives in all countries. In Fig. 2, showing the infant death rates for England and Wales, Scotland, and Holland in 1938, stillbirths have been added, and the infant death rates have also been divided into those for the first month and for the succeeding eleven months. This year has been chosen because it is the last year in which peaceful and stable conditions make possible any international comparison of vital statistics. It gives some advantage to Great Britain; for in England, and even more in Scotland, there was then a definite drop in the figures from the previous year, while the Dutch figures, already at a very low level for some years, showed little change in 1938. The figures in the three sections for each country are represented by horizontal bars drawn to scale, so that the eye may readily seize and compare the total loss of lives in the first year or in any of its sections—deaths during birth (stillbirths), in the first month, and in the later months.

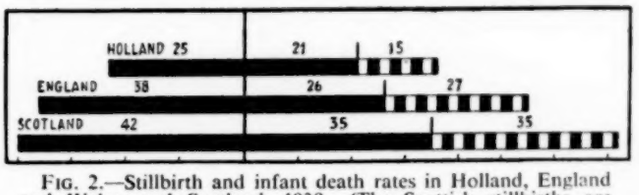

FIG. 2.—Stillbirth and infant death rates in Holland, England and Wales, and Scotland, 1938. (The Scottish stillbirths are for 1939.) The unbroken black bars left of the vertical line are stillbirths. The unbroken black bars right of the vertical line are neonatal deaths for first month. The chequered bars indicate deaths from second to eleventh month.

From a consideration of these charts of infant deaths in Holland, England, and Scotland there emerge several facts.

1. In the last sixty years there has been a great decline in infant deaths in all these countries.

2. In Holland this decline has been prodigious, so that, starting from the worst position, she is now well ahead of England and far ahead of Scotland. A comparison of infant death rates in 1938 shows the following figures: Holland, 36 (per 1,000 live births); England, 53; Scotland, 70.

3. A comparison of the subdivisions of infant deaths (including stillbirths) in that year shows Holland to be well ahead of England and far ahead of Scotland in all three subsections. These are disturbing facts which call for investigation. In attempting to explain them we may get some clues and pointers which may guide us to a more effective control of child health in Great Britain.

Causes of Infant Deaths

The causes of infant deaths are numerous. In considering them from the side of prevention some general grouping must be made and attention also be given to predisposing as well as to final causes.

Ante-natal and Natal

There is the group of deaths produced by conditions before and during birth—the major congenital defects, prematurity, asphyxia, birth haemorrhage (especially intracranial), and injury. These account for nearly all the stillbirths and the great majority of the early neonatal deaths: they come under the control of the obstetric physician and the midwife, and make up the hard intractable core of infant deaths. In a country like Holland these obstetrical infant deaths, consisting of stillbirths and early neonatal deaths, amount to about four-fifths of the total deaths of viable infants during the first year. They are catastrophic deaths; and their further reduction will not be easy, except with regard to prematurity, in which by an organized institutional service much more could be done to save the lives of these infants.

Post-natal Group

Here the principal cause of death is infection. The many kinds of infection need not be mentioned. We are considering here prevention, not treatment; and the prevention of infection lies in a *general strict technique of sanitation in the city, the street, and inside the home.* We may thus speak of sanitation as external and internal. In the sixty-year period under consideration the great and universal reduction in infant death rates has to a considerable extent been due to the control of infection by external sanitation—abundance of pure water, clean sound food, good drains and sewers, refuse disposal and street cleansing (not forgetting the disappearance of the horse with his excrement from the cities), and better houses. The improvement in internal or domestic sanitation has not been nearly so great, at least in our country. Next in importance as a lethal factor is mismanaged feeding of infants, which is still prevalent all over Great Britain; and although this is seldom a direct cause of death the malnutrition that goes with it gives easy entrance to infection. Mismanaged feeding ought therefore to be accepted as an important predisposing cause of infant deaths. There remains a group of miscellaneous diseases and accidents, which makes but a small addition to the aggregate of deaths in the post-natal group. The infants in this post-natal group come under the control of the paediatric physician, the family doctor, the child welfare doctor, and the hospital physician, with the assistance of the health-visitor-nurse. As a preventive service the members of this medical-nursing group are merely intermediaries or, rather, instructors, who pass on to the mother the technique of domestic sanitation and infant dietetics. It is only when the mother has the knowledge, the facilities for applying it, and the conscience to do so, that she can fulfil her task of guarding the health of the infant after birth.

With this general catalogue and grouping of the causes of infant deaths in mind we can now explain the much higher infant death rates in Holland sixty years ago and perhaps explain also her very low figures to-day. England was earlier than Holland in the adoption of drainage and water schemes; and Holland, with much of her land below sea level, presented special engineering difficulties in drainage. What I have called external sanitation was only just beginning to control and reduce infection in Holland in the 'eighties, while in England and Scotland this control was well under way; but once sanitary engineering was established the Dutch figures responded with a rapid fall, and began to overhaul the British infant death rates. This cannot, however, explain the decisive passing of our figures in the last twenty years, for there is no evidence that drainage and water schemes and the other measures included in general sanitation are to-day better in Holland than they are in England. Climate can hardly have much to do with it. Both countries are industrial rather than agricultural; but the "heavy industries" of coal and iron are much more numerous in Great Britain than in Holland, and this is a factor to be reckoned with. In Great Britain there was the aftermath of strain and exhaustion left by the war of 1914-18, which Holland escaped; and it is significant that the States of the Continent spared by that war, and including Holland, have all much lower infant death rates to-day than those that were engaged in it. There remains the medical and nursing control of infant health in Holland, England, and Scotland. Here are differences which deserve attention and which may account for a good deal of Holland's superiority.

Medical and Nursing Control of Child Health in Holland

Child welfare clinics in Holland became general about 1920—a year or two later than in Britain. The health nurses of the service receive a long thorough training for two years—one year spent in a maternity hospital training school and the second in a social institute with apprenticeship in a welfare clinic. The medical officers of the clinics consist mainly of hospital paediatricians, with a smaller number of family doctors; there are no special child welfare medical officers as in our service. The system as regards personnel thus consists of highly trained nurses, under the supervision of hospital paediatricians at the clinics, and doing a great deal of their work inside the homes under the supervision of the family doctors. In addition there is a network of powerful voluntary societies, the Green Cross and Yellow Cross, which have been at work since the beginning of this century, and have been retained since the establishment of the clinics, now receiving State and municipal money grants as well as public subscriptions. These societies largely educate in infant hygiene and home management, giving this instruction individually at home or in public lectures; but they also distribute food, clothing, etc., where there is need.

The Dutch, both men and women, are by habit and tradition a home-loving and home-keeping people. The industrial employment of married women is rare. About 80% of Dutch babies are born at home, and special attention is given to both mother and baby for a month after the birth: during the neonatal period, critical for both mother and baby, there are in attendance a skilled midwife and a health nurse; a home-help is also provided. There is therefore a close linking of the maternity and child welfare services, and a specially thorough training of the nursing personnel of both. *Post aut propter hoc*, Holland has an unparalleled conjunction of good vital statistics—a low maternal death rate, a high birth rate, a low stillbirth and infant death rate, and a low general death rate.

Medical and Nursing Control of Child Health in England and Scotland

The Child Welfare Service

In both countries the infant and child welfare service has the same structure, administration, and staffing; and it has been in operation since 1917. The essence of the service is

a chain of clinics. The medical personnel consists of special doctors, devoting themselves to the work of the clinics, and seldom engaged either at children's hospitals or in family medical practice. They enter the service with the diploma in public health, which gives very little special training for the problems of the child either in health or in disease. Some have been residents in children's hospitals, and some also have taken the London diploma in child health. On the whole it would be fair to say that the majority of child welfare medical officers receive a poor and inadequate preparation for their important clinical obligations, and that the busy routine of their work does not favour their getting a deep clinical experience of the problems they deal with.

Health Visitors.—The nursing branch of the service consists of health visitors. They are experienced hospital nurses who receive an additional six months' training. It is an omnibus training, and includes sanitation, sanitary law, local government and social legislation, fevers, tuberculosis, venereal diseases, and maternity and child welfare. This wide curriculum of study comprises a series of lectures, with practical or clinical instruction, including attendance at the child welfare and other clinics of the area. This training fits the health visitor to be a valuable assistant at the various municipal clinics ; but it is not thorough enough to make her a competent infant dietitian, and in her attendance at the various clinics she has too little time to go in and out of homes giving instruction in hygiene. In practice she is a public health clinic nurse rather than a home health visitor. The potential of service that can be rendered to the people by trained health nurses is immense ; but this potential is not achieved by the present training and employment of our health visitors. Their training needs fresh consideration: it should be longer ; it should also be more concentrated, more thorough, and more *clinical* in respect of infant feeding and home hygiene. And as regards their practice, the aim should be a service of child health nurses who deal only with their own big and complicated task, and spend the greater part of their time inside the home, where the issue of health for the child is decided. So much for the organized child welfare service. It revolves in its own orbit, and is rather detached from the hospital services dealing with children and from the family doctor.

Hospital Paediatricians.—Children's hospitals treat disease and are fully occupied with this work: it is regrettable that the special experience of their medical staffs is largely unused in the preventive service of child welfare.

Family Doctors.—The contribution of the family doctor to child health is important, although it is apt to be forgotten in our medical discussions and plannings. He is the expert in all family problems ; and, dealing with the child in the home, he ought to be the key *man* in the preventive service for children. If he is to play his full part, he requires better instruction in child health as an undergraduate, and in his practice he ought to direct and control the health visitors in the home and to have some share in or liaison with the clinics.

The present medical and nursing control of child health in Britain may be summarized in this way. The hospital paediatricians, with a few exceptions, deal with disease and have little or no part in its prevention. The official child welfare service is concerned with prevention, and carries out the work mainly at the welfare clinics. The training of its nursing and especially its medical staffs is inadequate. The family doctor is being ousted from preventive work in children, and in his undergraduate training receives far too little instruction in this department of medicine. The three branches of medical practice dealing with children are poorly co-ordinated. The whole system is sound in its theoretical structure: it has a good foundation, but requires improved technical training of its personnel in the medical schools and a better co-ordination and integration of its three elements—the hospitals, the clinics, and home practice.

Post-natal Causes of Death

We have been discussing child health in terms of infant death rates, and by that measurement comparing the state of child health, past and present, in Holland, England, and Scotland. In these countries the improvement in child health in the last fifty years has been enormous. It has been largely due to improved external sanitation and to the consequent reduction of infection. The available evidence does not suggest that Britain, the pioneer of the great sanitary reforms, is to-day behind Holland in its water and drainage systems, housing, etc. The comparison of the present infant death rates shows that Holland has not only a superior control of the ante-natal and natal causes of death but also a still more pronounced superiority of control of the causes of death operating after birth. These post-natal causes of death are largely due to infection, to infective material in the homes, to faulty internal or domestic sanitation. Internal and domestic sanitation is the business and responsibility of the mother and not of the "city fathers"; and it would seem that in Holland the mothers are better instructed about, and more alive to, the dangers of infection that beset the infant from birth, and so are better domestic sanitarians. In Britain it would be fatal to become slack in general sanitation, and our standard of housing ought to be raised ; but we specially need to raise the standard of domestic hygiene. That is confirmed by the discovery of large numbers of louse-infested children on evacuation from our large towns at the beginning of the war. A lousy school child means a dirty house and an increased risk of infant death from infection.

How has Scotland, with a similar lay-out of medical and nursing preventive services, fallen so far behind England? In the Report on Health Services in Scotland it is stated that general sanitation is below the English level ; if true, this is an important factor. In Scotland there are more bad houses ; a harsher climate, and so a greater desire for comfort and warmth indoors than for air and cleanness (there is a significant Scottish proverb : "The clartier, the cosier") ; more poverty ; and a great concentration of the population round the industries of coal and iron. This "vile concatenation" is enough to explain the higher Scottish infant death rates of to-day.

Disease in infancy is only one part of the preventive problem of child health ; but if we are to bring our mastery of this part to the point reached by Holland we shall have to concentrate our attention on two main objectives: *the prevention of infection in infancy by improved domestic hygiene*, and *the improvement of infant feeding, especially in the first month of life*. These two tasks are the work and responsibility of the mother. The doctor and the nurse cannot do that work or share that responsibility: they can only instruct her how these tasks are to be done. The State and the municipality in their turn must provide the economic and other facilities which give the mother the conditions that allow her to carry out her work for the infant properly. The preventive problem in children is an educational one, and the part played by doctors and nurses is that of teachers. The role of the nurse, as teacher, is more important than that of the doctor, because the care of the baby is a woman's problem, and has a deeper appeal to the understanding and conscience of the woman than of the man.

In the account of the control of child health in Holland reference was made to the work of the voluntary Green Cross and Yellow Cross Societies. Their work, too, includes instruction in the care of children; it constitutes a system of home education, maintained for many years, and contributes a great deal to the total result.

This comparison with Holland must not be pushed too far or in too much detail. But the principles and factors governing child health are universal; and a study of their application in a country like Holland, which sixty years ago was far behind and has now outstripped us in the saving of infant lives, at least supplies a stimulus and can give direction to our efforts to improve our own position.

Proposals for Reform

These criticisms of our present system of infant health control in Great Britain, and the constructive proposals for reform which follow, are suggested by my experience as teacher and physician in a children's hospital and as paediatrician in a maternity hospital with an attached infant clinic, and by the poor showing of our infant death rates in comparison not only with Holland but with other countries in the Old and the New World.

The centre of the present system is a child welfare service with a special staff of doctors and nurses. Working outside this centre, and only in loose touch with it, there are the hospital paediatricians and the family doctors. The hospital paediatricians have the deepest clinical experience of the child of all these three types of medical men; yet their experience is used very little in the preventive service. The family doctors actually make a valuable contribution, but, in view of their special knowledge of homes and their daily practice there, they could do much more. The worst fault of all, however, is the poor and inadequate teaching of the subject in our medical schools. Preventive medicine in childhood cannot be properly taught without the material of study—namely, healthy infants and children. This clinical material exists in the nurseries of maternity hospitals and in child welfare clinics, but not at children's hospitals, where the present teaching is given.

The objectives of reform are therefore a much better training of all nursing and medical personnel concerned with children, and a fuller use of family doctors and hospital paediatricians in preventive practice. To reach these objectives the outline of a scheme of training and practice in child health would be as follows:

Child Health Training Schools

Good training is fundamental, and improvement here would bear rich fruit in practice.

1. *The Training Schools.*—At the teaching maternity hospitals of medical schools, abundant clinical material for training schools in child health is to be found in the nurseries and in the attached child welfare clinics. Such clinics already exist at some of our teaching maternity hospitals; but they need to be strengthened in staff, and to be developed and equipped for both teaching and investigation. The principal staff would consist of a teaching paediatrician in the medical school, the senior child welfare officer of the area, and a health-visitor-nurse specially trained in practice and in teaching; with suitable assistants. Similar training schools might also be set up at teaching children's hospitals, although there the clinical material of the important first month of life is lacking.

2. *Health Visitors.*—At these training schools teaching in maternity and child welfare would be given to health visitors and other types of nurse dealing with children; with special attention to thorough and practical teaching of breast-feeding and bottle-feeding, and of infant and domestic hygiene and economy. The present curriculum of study for health visitors should be revised with a view to their main employment as instructors in child health. The better training of health visitors is the most urgent requirement for the improvement of our child health service. Such training schools for health visitors would follow the model of the health-nursing schools of Holland, Denmark, Australia, New Zealand, and U.S.A.

3. *Doctors.*—Here also a suitable programme of teaching would be given to medical undergraduates, postgraduates, and candidates for the child welfare and school medical services.

4. *Child Welfare.*—These child welfare centres attached to hospitals, with their triple function of practice, teaching, and investigation, would be a central link in the chain of child welfare centres in the area, and an integral part of that service as regards practice. They would be a focus for the study of health problems in the area and a place of meeting for all engaged in preventive practice. The medical officer of health for the region would have a share in their administrative control.

Practice

Improved practice will follow improvement in teaching. But there are certain reforms in the *system* of preventive practice in child health which are important. The gist of these is to give the health visitor more *responsible* practice both in the home and in the clinic, and also to give the family doctor his proper place; to extend and deepen the experience of the child welfare medical officer and bring him into closer touch with the home and the hospital; and to introduce the hospital paediatrician into the system, both in the training school and in other clinics.

5. *The Home.*—The key person is the trained health visitor, giving instruction to the mother in the home in the feeding and care of the infant, and in the keeping and management of the house; doing this under the supervision of the family doctor, and also carrying out his directions in the treatment of ailments and illness at home.

6. *The Clinic.*—The clinic is of less importance: it is a useful assembly-point for the parade and review of healthy infants and children, and for the group-teaching of mothers. Much of this work can be carried out by the health visitor, under the supervision of the family or welfare doctor. The detection of illness or malnutrition is also a valuable part of the work of the clinic; and in this a place can be found for the family, the welfare, and the hospital doctor. The welfare doctor should be given opportunities of seeing and taking part in home preventive practice and hospital work, and of escaping the deadening effect of the treadmill of clinics.

7. *Advisory Committee.*—There should be a statutory committee of practising paediatricians in each national department of health, with advisory powers.

8. *The First Month.*—The last point is the importance of the first month in preventive practice. Most of the chronic dyspepsias of infancy begin in the first month of life from mismanagement of breast- and bottle-feeding, and chronic dyspepsia is easily turned into acute and fatal infection by the prevalence of bad hygiene. The present disastrous gap in the medical and nursing control of the baby after the first fortnight of life ought to be made good by a *thorough skilled supervision of the baby in the home throughout the first month by the health visitor and the family doctor.*

Conclusion

The infant death rate is a good index of the standard of child health, and all over the world there has been a steep fall. This has been brought about in great part by improvement in external or environmental sanitation. The fall in England and Wales, and especially in Scotland, has not kept pace with that in a number of countries in the Old and the New World. This lag has not been the result of faulty obstetrics, but of a lack of knowledge on the part of nurses and doctors responsible for the welfare of infants after birth. This lack of knowledge is due to the poor training given to medical students and nurses in our medical schools. The first and surest step towards reform is the setting up in our universities and medical schools of departments in infant and child health, where the subject can be studied and taught to all concerned. In the protection of infant health, the nursing service is

of cardinal importance; and in countries like Holland, Sweden, and Australia, and in great towns like Amsterdam and Chicago, which now lead the world in their low infant death rates, special attention has been paid to the training of health nurses. In the light of these facts, the curriculum and the training of our health visitors must be drastically overhauled and improved. With the better training of the nurse we must also have better training for the family doctor and the welfare clinic medical officer. That work of training seems to lie in the hands of the physicians in the teaching children's hospitals; but they must be given the clinical material for study and the facilities for teaching.

A perfect sanitary system alone cannot achieve a low infant death rate. To it must be added good obstetrics, which includes the skilled care of the mother before and during birth and the care of the infant and instruction of the mother after birth, which make up good paediatrics. We may justly claim that our obstetrics is good, and that by study and teaching a constant effort is being made to improve it. But in comparing our infant death rates with those of countries like Holland and others we must admit that our preventive paediatrics is second-rate. A reduction of infant death rates in England and Scotland to the forties and thirties is not likely to come about by better drains and better houses, or by multiplication of our child welfare clinics and health visitors. For a further substantial reduction in infant deaths the first requirement is that those who teach the mother how to protect the health of her baby must themselves be taught and trained in these protective techniques in our medical schools.

THE TREATMENT OF PHOSPHORUS BURNS

BY

E. W. GODDING, M.P.S.

AND

H. E. F. NOTTON, B.Sc.

Our attention has been drawn by Major Roland Heath, commanding officer of the Northwood, Middlesex, Home Guard, to the lack of adequate first-aid treatment of phosphorus burns. As the incidence of these burns may be considerable if hostilities extend to this country, the subject is obviously of great importance. Major-General T. S. Coates (1941) gives the following description of the official method of treatment, which is obviously unsuitable for first-aid application:

"1. Wash the burn immediately with a solution of sodium carbonate (2 tablespoonfuls to a pint of water). This treatment neutralizes any phosphoric acid formed as the result of the combustion of phosphorus, and partially destroys any free phosphorus present.

2. To free the burn from all traces of phosphorus, wash with 1% solution copper sulphate. Copper sulphate combines with free phosphorus, forming copper phosphide, thus preventing further ignition.

3. Remove the resulting dark-coloured deposit with forceps, and thoroughly wash with water containing a little antiseptic.

For extensive burns requiring hospital treatment, ultra-violet radiation is recommended and dressings of picric acid, etc., as for ordinary burns. Phosphorus burns suppurate much more than ordinary burns, and the healing period is usually three to four weeks."

We thought that it would be possible to replace the copper sulphate and alkali solutions with powders to be carried in small sifter containers from which they could be sprinkled on to the wound and worked up to a paste with water from the water-bottle. Eventually a powder was obtained which appeared to form a suitable substitute for the alkaline solution; but, to replace the aqueous copper sulphate, a concentrated glycerin paste was found to have advantages over the powder preparations that were tried.

The greatest experimental difficulty was to obtain for treatment material similar to human phosphorus burns, the best available substitute being burns produced on shaved areas on the skins of rats recently killed in connexion with other experiments. The phosphorus-containing layer of an actual S.I.P. (self-igniting phosphorus) bomb was used as the source of phosphorus. This is referred to below as phosphorus liquid.

The experiments fell into three groups: (1) *in vitro* observations on the action of copper preparations of phosphorus liquid; (2) application of phosphorus liquid without ignition for varying periods of time to the skin of rats, and subsequent treatments; and (3) production of phosphorus burns on the skin of rats, and subsequent treatments. Small amounts (50 to 100 mg.) of the phosphorus liquid such as were often used in the following experiments do *not* ignite spontaneously unless the surface area is considerably increased.

Action of Cu Preparations on Phosphorus Liquid

Phosphorus Liquid with 1% Aqueous Copper Sulphate.—When a small globule of phosphorus liquid is rubbed up with 1% aqueous copper sulphate on a glazed tile very little action takes place. The liquid may be broken up into smaller globules and some brownish flakes may form at the interface, but the bulk of the phosphorus and copper sulphate fails to react. Further, chemical considerations indicate that the amount of copper which can be precipitated from solution by phosphorus is in the atomic ratio of at least 2 Cu : 1 P (Mellor, 1928)—i.e., 1 part of phosphorus to approximately 16 parts of copper sulphate or 1,600 parts of the 1% solution. In other words, even if complete reaction took place 3½ fl. oz. of the 1% solution would be required to destroy 1 grain of phosphorus.

Having regard to the adverse factors which exist in practice, it became obvious that a material of much higher concentration than the official solution would be required to effect a complete and rapid immobilization of even small quantities of phosphorus, whatever the precise method of application. This theoretical consideration appears to indicate one of the weaknesses of the official method.

Phosphorus Liquid and Copper Sulphate - Kaolin Mixtures.—The first powders tried were finely divided mixtures of copper sulphate and colloidal kaolin containing 5 to 50% of the former. The effect of these mixtures varied with the amount of water used in working up the liquid phosphorus with the powder. (It is important to notice that, in contact with any dry powder or fibrous material, such as paper, cloth, or cotton-wool, the phosphorus liquid ignites spontaneously owing to the exposure of a large surface by capillary action. *All treatments applied to a phosphorus burn must therefore be wet, so long as free phosphorus is present.*) When enough water was added to form a very thin cream the result did not differ greatly from that obtained with aqueous copper sulphate. A fairly stiff cream had a better effect in splitting the phosphorus globules, but reaction was slow unless considerable energy was used in grinding the materials together, and it was usually possible to observe globules of unchanged phosphorus by microscopical examination of the mixture.

Use of Emulsifying Agents.—A search for emulsifying agents capable of facilitating the break-up of phosphorus globules and thus exposing them to the more rapid action of the copper sulphate led to the following two formulas:

Formula 1		*Formula 2*	
Copper sulph.	50%	Copper sulph.	50%
Kaolin	45%	Kaolin	49%
Sulphonated lorol ..	5%	Sod. tauroglycocholate ..	1%

Each of these powders when stirred up to a moderately thick cream with phosphorus liquid gives an immediate emulsion in

which reaction, with the formation of a black coloration, rapidly takes place. *Provided sufficient copper sulphate is present* and the mixing is thoroughly carried out, free phosphorus disappears completely in a few minutes.

Paste Preparations of Copper Sulphate.—The view that a paste preparation of copper sulphate would be superior to a powder (*a*) because it might incorporate a hygroscopic material such as glycerin, which would avert the danger of drying before all the phosphorus had been destroyed, and (*b*) because the copper would be in solution and immediately available for reaction, led to the production and testing of a number of such preparations. The general results showed that when phosphorus liquid is rubbed up on a tile with a viscous liquid, such as a paste containing a high percentage of glycerin, a rapid mechanical emulsification is obtained. With a somewhat less viscous liquid containing an emulsifying agent, such as bile salts, there is equally good emulsification; while with still thinner products emulsification is poor. Emulsification is judged by microscopical examination or, if copper sulphate is present, by the formation, after keeping for a few minutes, of either a uniform brownish-black paste or one containing larger or smaller black specks, arising from undispersed globules of phosphorus. Mixing on a tile forms a more delicate test for emulsifying power than does, for instance, rubbing on the palm of the hand. Mixtures which show little emulsification in the former condition often give an immediate production of copper phosphide under the latter, owing possibly to higher temperature and friction. Glycerin has a particular advantage in its high solvent power for copper sulphate, and in spite of numerous trials no substitute of equal efficiency has as yet been found. For example, among hygroscopic agents, ethylene and propylene glycols are inferior to both glycerin and water as solvents for copper sulphate. Propylene glycol - water - copper sulphate solutions show no appreciable viscosity advantage over ordinary aqueous solutions. Syrups containing sodium lactate, sugar, or golden syrup had a good emulsifying action on the phosphorus, but were poor solvents for copper sulphate. Thin gels of starch or gelatin, which although highly viscous have little mechanical strength, have not the necessary "drag" and produce rather poor emulsification. Pastes containing copper hydroxide or carbonate react with phosphorus, but more slowly than copper sulphate solutions. They are open to the objection that more copper would be left in the tissues after treatment than would be the case with a soluble salt owing to the difficulty of washing the material away. The following formulas are recommended, the second being introduced as a slightly less efficient substitute in the interests of glycerin economy.

Formula 3

Copper sulph.	22.5%
Glycerin	67.5%
Starch	5.0%
Water	5.0%

Formula 4

Copper sulph.	20.0%
Glycerin	40.0%
Starch	7.5%
Sod. tauroglycocholate	1.0%
Water	31.5%

Liquid Phosphorus and the Alkaline Powder.—The alkaline powder (Formula 2A, below) was also found to have an excellent emulsifying action on phosphorus liquid, although the effect appeared to be entirely mechanical. This had an important bearing on the final method of treatment adopted.

Application of Phosphorus Liquid to Skins of recently killed Rats

When amounts of 50 to 100 mg. of phosphorus liquid are applied to shaved areas on the skins of recently killed rats they do not usually ignite, but undergo a slow atmospheric oxidation accompanied by phosphorescence. The material was left in contact with the skin for varying periods, so as to study the penetration of the phosphorus under more easily controlled conditions than in the case of an actual burn, and also to gain experience of the immobilization of larger quantities of unignited phosphorus than are found in an ordinary small burn.

Comparison of Solution and Powder Treatments.—In these experiments the phosphorus liquid was applied for varying periods, some of the rat skins being then treated by the official method and others with powders. In these tests we used the copper sulphate - kaolin mixtures already mentioned and alkaline powders composed of:

Formula 1A

Kaolin	42%
Sodium bicarbonate	42%
Borax	16%

with or without emulsifying agents, such as sulphonated lorol or bile salts.

The results were such as would have been expected from the foregoing section. There was a tendency for the official solutions to displace phosphorus globules from the site of application without destroying them, whereas the powders kept the globules under better control. The most noteworthy effect observed, however, was the relative depths of penetration of the phosphorus and of the acid formed by its oxidation. After a few hours' contact with unignited phosphorus in air the skin was visibly altered, becoming stiffer and more translucent. After the appropriate period of application a piece of skin including the treated area was cut out, and tests were applied to the exposed surfaces to determine the degree of penetration. It was noticed that whilst a blackening with copper sulphate could be obtained only on the surface which had been in actual contact with the liquid, there was a steady penetration of acid, eventually extending through the skin to the subcutaneous tissues. The presence of acid was detected by observation of the effervescence on applying sodium bicarbonate, control tests being made on untreated areas of skin in the same animal. The results are shown in the following table:

Rat No.	Length of Application	Acid Present		Cut in S.C. Tissue
		Inside of Skin	Surface of S.C. Tissue	
1 & 2	½–½ hour	–	–	–
3	4¼ hours	+	+	–
4	9 ,,	+	+	?
5	24 ,,	++	++	+
6	32 ,,	++	++	++

These experiments were conducted with the skin at room temperature. It is reasonable to assume that the penetration would be more rapid at blood heat.

Note.—In an experiment in which the phosphorus was ignited and allowed to burn for two minutes there was immediate deep penetration of acid. Experiments of this kind are, however, difficult to control owing to the frequent occurrence of skin perforation.

It is concluded that in the official treatment not enough importance is attached to the removal of the deeply penetrating acid, and this indicates the second weakness of that method.

Production and Treatment of Phosphorus Burns on Skins of recently killed Rats

In forming the burns it was found convenient to confine the phosphorus liquid (50 to 100 mg.) within a metal ring (15 mm. in diameter) pressed tightly against the skin. This prevented the phosphorus from spreading and made the results more comparable. The phosphorus burned for one to two minutes and produced a second- or third-degree burn. The experiments were usually done in pairs, equal quantities of liquid being applied and allowed to burn for equal periods. The one burn was then treated by the official method and the other with the powders or paste, equal times of treatment being allowed.

The powders containing kaolin were found to be somewhat inconvenient to remove by subsequent washing. The copper sulphate powder was therefore replaced in our final experiments by the glycerin paste, and the alkaline powder by one composed as follows:

Formula 2A

Magnesium oxide, heavy	10%
Borax	5%
Sodium bicarbonate	85%

In addition to its good emulsifying power for phosphorus, this material is a free-flowing powder very suitable for use in a dredger. These advantages are given by the admixture of magnesium oxide, and both this substance and the borax confer a more alkaline reaction than sodium bicarbonate alone.

Finally, a test was made for free phosphorus in each burn, a convenient method being to dry the burn and then to rub the burnt area vigorously in a dark room, very small quantities of phosphorus rendering themselves visible by luminous flashes. Drying must be thorough (e.g., twenty minutes in a current of air at 40° C.) and rubbing must be persisted in for, say, three to four minutes before a negative result can be admitted.

The results, as expected, showed uniform and complete removal of free phosphorus when using the powder and paste; but when using the solutions, results were variable, and removal was often incomplete.

Proposals for the Treatment of Phosphorus Burns

As a result of the foregoing considerations we put forward the following rationale of treatment:

Stage I.—Remove the bulk of the free phosphorus and superficial acid with alkaline powder (Formula 2A). Under no circumstances must liquid suspected of containing phosphorus be dabbed with a handkerchief or other dry material. If water has been used to extinguish the phosphorus, sprinkle the powder on to the wet surface, add more water if necessary, and work up to a medium thick paste, covering the whole of the burn and the surrounding area if contamination is suspected. Wash or wipe off and reapply so long as marked effervescence continues. Drying must be avoided at this stage. The advantages claimed over the corresponding stage in the official treatment are: portability; greater concentration and osmotic effect (drawing acid products of combustion from the wound); and the prevention of displacement of unignited phosphorus to other parts of the body or clothes.

Stage II.—Immobilize the whole of the remaining free phosphorus by the use of glycerin–copper sulphate paste (Formula 3 or 4). Apply sparingly but thoroughly, *and rub well in.* Remove by washing or wiping as soon as no smell of phosphorus is perceptible in the wound. The advantages claimed over the same stage in the official treatment are: portability, concentration, rapidity, osmotic effect, and completeness of action.

Stage III.—Neutralize the deep-seated penetration of acid with alkaline powder (Formula 2A). Reapply the powder, work up to a paste with water, bandage, and dampen bandage occasionally. Do not allow bandages to dry. The importance of this stage has apparently not been previously recognized.

Stage IV.—Remove to hospital labelled "Phosphorus Burn."

Regarding subsequent hospital treatment we would suggest that all forms of coagulation therapy (tannic acid, picric acid, silver nitrate, etc.) be avoided in view of the obvious necessity for not "sealing in" the acid products. The very painful nature of phosphorus burns and the tendency to delayed healing may possibly result from the inadequate treatment of this acid concentration, and the alkalinity of the tissues may not be sufficient to deal with it. It is suggested, therefore, that continuation treatment should be alkaline in character, and might consist ideally of the envelope treatment with sodium hypochlorite solution.

Summary

Serious weaknesses of the official treatment of phosphorus burns are pointed out.

A rational first-aid treatment is described which can be issued in a simple portable form suitable for inclusion as standard equipment for use in the field.

Continuation treatment in hospital is also discussed.

We acknowledge with thanks the facilities generously provided by the Crookes Laboratories, which have made this investigation possible.

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M. Josephi, J. Mehlman, and D. Hager (*J. Pediat.*, 1941, **19**, 823) record a case of influenzal meningitis in a male infant aged 7 months who made an uncomplicated recovery after treatment with large doses of sulphapyridine and a minimal amount of serum. Culture of the spinal fluid showed *B. influenzae*.

THE RELATIVE NEEDS OF YOUNG MALE AND FEMALE RATS FOR VITAMIN A

BY

KATHARINE H. COWARD, D.Sc.Lond.

(From the College of the Pharmaceutical Society of Great Britain)

It has been shown (Coward *et al.*, 1931) that if young rats were given a diet deficient in vitamin A until their reserves of that factor had been exhausted, and were then given relatively small doses of vitamin A, the response of the male rats (increase in weight in five weeks) was less than that of the female rats. When the dose of vitamin A given was rather larger the responses of the two sexes were equal, and when larger still the response of the male rats was greater than that of the female rats. This was depicted graphically by drawing the curves of response of male and female rats respectively to five graded doses of cod-liver oil, the average increase in weight of each group of rats being plotted against the logarithm to base 10 of the dose of oil given. The curve of response of the male rats was steeper than that of the female rats, and the two lines crossed at the point where the increase in weight was 13.7 gm. and the daily dose of the sample of cod-liver oil given was about 1.2 mg. (equal to about 1.8 international units of vitamin A, as determined later). The smaller response of the male rats to low doses of vitamin A indicated that the male rat was more sensitive to a shortage of this factor than was the female rat.

All the tests of low doses of vitamin A which had up to that time been carried out in our laboratory were then examined for the number of male and female rats that had died in each group, every member of any one group having received the same dose of cod-liver oil. It was found that, in 23 groups, 57 out of 288 male rats and 37 out of 277 female rats had died. Dr. J. H. Gaddum supplied a calculation based on the numbers of groups in which more males than females and more females than males, respectively, had died. The numbers were 17 and 5, and 1 in which the mortalities of male and female rats were equal. His value of χ^2 was 6.26. The table of χ^2 shows that the probability of this value of χ^2 being due to chance is between 1/50 and 1/100 (Fisher and Yates, 1938). Hence it was concluded that there was a strong probability that young male rats are more sensitive to a shortage of vitamin A than young female rats.

Since the publication of that paper many more determinations of vitamin A have been carried out in this laboratory by the same method, and it seemed worth while to examine some of our recent work to obtain more information on this point. It happened that we had used a particular sample of cod-liver oil as a standard of reference for determining the vitamin A (carotene) content of a large number of fruits and vegetables, and the international standard of reference (carotene) for determining the vitamin A content of a large number of substances containing vitamin A of animal origin. Thus it was possible not only to obtain the further information required on the relative needs of male and female rats for vitamin A but also, by separating the groups given vitamin A of animal origin from those given vitamin A (β-carotene) of vegetable origin, to see whether this difference in response between male and female rats applied to both sources of the vitamin.

Calculations of tests which fell naturally into four groups have been made. They are summarized in Table I and also put out separately, for several results all supporting the same conclusion are often more convincing than one total result.

TABLE I.—*Relative Needs of Male and Female Rats for Vitamin A*

Tests	All Groups			Groups given Vitamin A of Animal Origin			Groups given Vitamin A (β-carotene) of Vegetable Origin		
	No. of Groups in which died:			No. of Groups in which died:			No. of Groups in which died:		
	More Males	More Females	χ^2	More Males	More Females	χ^2	More Males	More Females	χ^2
Fruits and vegetables from Ceylon compared with a sample of cod-liver oil (Z) as standard	78·0	46·0	8·26	29·5	16·5	3·67	48·5	29·5	4·63•
Routine tests carried out under war conditions, mostly vegetable products compared with inter. standard	27·5	7·5	11·43	9·0	3·0	3·0	18·5	4·5	9·14
Research tests carried out under war conditions, mostly vegetable products compared with inter. standard	57·0	7·0	39·19	12·0	1·0	8·31	45·0	6·0	29·82
The last 200 groups in tests carried out before the war, mostly animal products compared with inter. standard	137·5	62·5	28·13	91·5	41·5	18·80	47·0	20·0	10·88
For all tests	300·0	123·0	74·06	142·0	62·0	31·37	159·0	60·0	44·75

The significance of the values of χ^2 found above may be judged from the following figures quoted from the χ^2 table. The probability that the difference between males and females in their need for vitamin A is due to chance is 0.10 when $\chi^2=2.706$; 0.05 when $\chi^2=3.841$; 0.02 when $\chi^2=5.412$; 0.01 when $\chi^2=6.635$; 0.001 when $\chi^2=10.027$.

A probability of 0.10 (or more) of the result being due to chance is generally considered a pretty good one, and no significance would be attached to a result giving this probability. A probability of 0.01 to 0.05 of the result being due to chance is not good, and the result would be accepted as fairly dependable. A probability of 0.001 of the result being due to chance is almost *nil*, and the result would be accepted as almost certainty. Most of our separate values are highly significant, and the values of the totals leave no room at all for doubt of the fact that young male rats are more sensitive to a shortage of vitamin A than young female rats. The further analysis of the results shows also the same difference between male and female behaviour whether the vitamin A is of animal or of vegetable origin. Hence young male and female rats seem to have equal ability to convert carotene into vitamin A.

TABLE II.—*Deaths under 1 Year per 1,000 Live Births*

Period	Deaths		Ratio M/F	Period	Deaths		Ratio M/F
	Males	Females			Males	Females	
1891	164	133	1·23	1915	123	96	1·28
2	162	132	1·23	6	102	80	1·28
3	173	143	1·21	7	108	85	1·27
4	150	124	1·21	8	108	86	1·26
5	176	144	1·22	9	100	78	1·28
6	161	134	1·20	1920	90	69	1·30
7	170	141	1·21	1	93	72	1·25
8	175	145	1·21	2	87	66	1·32
9	177	148	1·20	3	78	60	1·30
1900	169	139	1·22	4	85	65	1·31
1	166	136	1·22	5	84	66	1·27
2	147	118	1·25	6	79	61	1·30
3	145	118	1·23	7	79	60	1·32
4	159	131	1·21	8	74	56	1·32
5	141	115	1·23	9	83	65	1·28
6	145	120	1·21	1930	68	51	1·33
7	130	104	1·25	1	75	57	1·32
8	133	107	1·24	2	73	56	1·30
9	120	97	1·24	3	72	55	1·31
1910	116	94	1·23	4	65	51	1·28
1	142	117	1·21	5	64	50	1·28
2	106	84	1·26	6	66	50	1·32
3	120	96	1·25	7	65	50	1·30
4	116	93	1·25	8	60	46	1·30

It is tempting to speculate on the possibility that a low intake of vitamin A by human babies may have a greater influence on male infants than on female infants in their mortality from, say, 0 to 1 year of age. The numbers of deaths under 1 year of age per 1,000 live births of male and female infants published by the Registrar-General are shown in Table II together with the ratio male/female deaths for each year from 1891 to 1938. The numbers of deaths per 1,000 live births have fallen dramatically in that time for both males and females, and this fall must have been due to the influence of a very great many factors. One point, however, is of particular interest: the ratio of male/female deaths, already high in the 1890's, rose steadily from about 1900 to 1920, since when it has remained nearly constant. Assuming that all forms of extra care lavished on infants in the last fifty years have been given to male and female infants equally, is it possible (*a*) that the extra cod-liver oil given since prenatal and child clinics have been operating has been sufficient to bring about some improvement only, which, according to the rats, would be greater in the females than in the males; and (*b*) that by giving abundance of vitamin A, which would mean more cod-liver oil for boys than girls, the ratio of male/female deaths would be reduced to unity?

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PUERPERAL CEREBRAL THROMBOPHLEBITIS TREATED BY HEPARIN

BY

F. ROSS STANSFIELD, M.D., F.R.C.S., M.R.C.O.G.

Gynaecologist, East Suffolk and Ipswich Hospital

Thrombophlebitis of the cerebral veins and sinuses has been recognized for many years as a rare and fatal complication of the puerperium. Von Hösslin (1904, 1905) reported a large series of cases in which the nervous system was involved during pregnancy and the puerperal state: these included five fatal cases of cerebral thrombophlebitis. Subsequently, no doubt, other examples of the condition have been recorded as cases of "late eclampsia," but interest seems to have waned until the publications of Symonds (1940), Martin (1941), and Martin and Sheehan (1941). In particular, Symonds points out that it is possible to diagnose the condition during the life of the patient, and says that, in his opinion, the prognosis is not so gloomy as a perusal of the literature would suggest.

Aetiology

The thrombosis has been termed "primary" in Gowers's sense, in that obviously it does not arise out of a local infective condition, but is rather the result of an increased coagulability of the blood. Fresh light has been shed on the problem by the experimental work of Batson (1940), who demonstrated that it was possible for emboli to pass from the pelvic veins via the vertebral venous plexuses to the cerebral veins. The factor favouring this condition was a rise in the pressure in the inferior vena cava.

Armed with this information, one may readily imagine small thrombi in the pelvic veins that would give no clinical evidence of their presence being detached during the effort to use a bed-pan. Normally these emboli would find their way to the lungs and give rise to the signs of pulmonary infarction, but a moderate degree of increased pressure in the inferior vena cava would divert the particles to the by-pass formed by the vertebral venous plexuses, and the clots would finally lodge in the cerebral veins.

Symptoms.—The time of onset of the initial symptoms varies widely; in one case it was as early as the fourth day of the puerperium, and in another as long as 137 days after delivery. Headache, paraesthesiae, and weakness of a limb are the early evidences of the cerebral complication and are soon followed by definite paralysis; in most cases epileptiform convulsions and coma close the scene.

Signs.—Neurological examination of one of these cases usually reveals a monoplegia or a hemiplegia; less commonly an aphasia or a homonymous hemianopia is detected. The intracranial pressure is not uncommonly raised, as evidenced by vomiting, papilloedema, and the increased pressure noted on lumbar puncture. The temperature is markedly raised, but the pulse rate, though quickened, does not rise in proportion. Examination of the cerebrospinal fluid may disclose no abnormality, but commonly there is an increased protein content, with traces of blood.

Differential Diagnosis

(*a*) *Cerebral Haemorrhage, Thrombosis, or Embolism.*—The history of the case and the absence of cardiovascular changes usually admit of a decision being made.

(*b*) *Cerebral Tumour.*—Here reliance must be placed on the history and on the finding of an increased protein content of the cerebrospinal fluid in the absence of blood.

(*c*) *Meningitis.*—This is readily excluded by the examination of the cerebrospinal fluid.

(*d*) *Uraemia and Diabetic Coma.*—These are readily excluded by the examination of the blood and urine.

(*e*) *Fat Embolism.*—This is a rare complication of labour, and when present is usually associated with marked trauma. Fat particles may be detected in the urine, but, admittedly, a differentiation from cerebral thrombophlebitis is practically impossible in life.

(*f*) "*Late Eclampsia.*"—This term is a misnomer. Eclampsia developing as late as the fourth day of the puerperium is unknown.

Prognosis

I have succeeded in tracing in the literature 14 definite cases of cerebral thrombophlebitis during the puerperium, of which 8 were fatal; and below are recorded 2 further examples of this complication, one of the patients dying from it. This gives a fatality rate of 56%. Probably that figure is too high, as it is possible to make a confident diagnosis of the condition only in the severer cases. No doubt the increased interest in this particular catastrophe will result in milder cases being detected and larger series of cases being reported, with a consequent revision of our, at present, gloomy prognosis. Theoretically the modern treatment with heparin should provide the answer to our problem.

Treatment

Prophylaxis.—In view of the probable aetiology of cerebral thrombophlebitis during the puerperium every step should be taken to prevent thrombosis in the pelvis and lower extremities by means of prophylactic intravenous injections of heparin as recommended by Crafoord and Jorpes (1941). The circulation in these areas can be promoted by exercises, massage, and the use of a foot-board in conjunction with elevation of the head of the bed. No tight binder should encircle the abdomen, as this would tend to obstruct the inferior vena cava, and straining at stool should be prevented.

Curative Therapy.—Once the disaster has occurred, treatment is directed along three main lines: (1) Control the thrombosis by the use of heparin, which may be given by a continuous intravenous drip in normal saline or 5% glucose solution. Jorpes has shown that, where the large volume of fluid administered by the above method is contraindicated, equally good results may be obtained by four-hourly intravenous injections of concentrated solutions of heparin—i.e., in the form of a 5% solution of heparin standardized to contain 70 Toronto units per mg. and given in 1-c.cm. doses. (2) Reduce the intracranial pressure by lumbar puncture, and give intravenous injections of 50% glucose or 10 c.cm. of 20% magnesium sulphate solution intramuscularly. (3) Control the fits by chloroform anaesthesia initially, and subsequently by rectal avertin or injections of sodium phenobarbitone.

Case Reports

CASE I

A primigravida aged 25 underwent a lower segment Caesarean section under light percaine spinal anaesthesia on August 10, 1940. The puerperium was normal until 4 a.m. on the eighth day, when she complained of numbness in her right forearm. At 8.30 a.m. epileptiform convulsions set in. The fits were controlled by chloroform anaesthesia, whilst a lumbar puncture was carried out. The cerebrospinal fluid was under a pressure of 340 mm. H_2O, and contained 225 mg. of protein per 100 c.cm. and 5,400 red cells per c.mm. Urinalysis showed a trace of albumin, which had been absent previously, and the blood urea was 30.5 mg. per 100 c.cm. Her blood pressure was 140/80. Signs of a right hemiplegia became more obvious during the day. After the anaesthetic had worn off sodium phenobarbitone and nembutal were administered to control the further convulsions, and intravenous injections of 100 c.cm. of 50% glucose solution and intramuscular injections of 10 c.cm. of 20% magnesium sulphate solution were given alternately, in conjunction with repeated lumbar punctures, to control the rising intracranial pressure.

A tentative diagnosis of superior longitudinal sinus thrombosis was made. The same evening the honorary physician, Dr. Ronald Jones, saw the patient. He confirmed the treatment already given, and did not disagree with our view of the case. Despite all our efforts the fits continued until 3.45 a.m. the next day, after which time the patient remained in coma until her death at 10.30 p.m.

A post-mortem examination revealed a thrombosis of the superior longitudinal sinus, extending into the right lateral sinus, and an associated thrombosis of the veins of the left frontal lobe, which was in a softened state. No other abnormality was detected, and no thrombosis could be found in the pelvic veins.

CASE II

A primigravida aged 25 was admitted on October 15, 1940, on account of delay in labour due to the presence of a large foetus and to a minor degree of contraction of the pelvic outlet. Under spinal anaesthesia an episiotomy was performed and a mid-forceps extraction of a living child effected. A catheter specimen of urine taken just after delivery revealed the presence of pus cells, and on culture a scanty growth of *Staph. aureus* was obtained.

For the first nine days of the puerperium the only abnormal feature was an evening temperature ranging from 98.4° to 99.4° F. At 10 a.m. on the ninth day the patient complained of tingling in the right hand, mistiness of vision, and a right frontal headache. Examination showed that a right homonymous hemianopia was present. At 6 p.m. dysarthria was noted, and the first epileptiform fit occurred at 9.33 p.m. Our recent experience with Case I made the diagnosis only too obvious: treatment was at once instituted on similar lines. A lumbar puncture revealed a normal pressure of the cerebrospinal fluid, which contained 5 cells per c.mm. and 65 mg. of protein per 100 c.cm.

Dr. Ronald Jones saw the patient the next morning and agreed with the diagnosis. After discussion heparin therapy was tried, as it seemed to be a rational line of attack and it had previously given good results in cases of thrombophlebitis of the lower extremities in the gynaecological ward. An intravenous drip of 5% glucose saline was started, and was continued at the rate of a pint every four hours. Each pint contained 200 mg. of heparin, equivalent to 16,000 Toronto units. This therapy raised the blood coagulation time to over forty minutes, a considerably longer period than that recommended by McClure and Lam (1940). Heparin therapy was continued on the above lines for four days, by which time the patient had apparently fully recovered.

A thrombophlebitis developed in the left leg on November 12 and in the right leg on the 15th, while there was a return of the cerebral symptoms in a very mild form on the 17th. Further heparin treatment rapidly relieved these troubles. On November 23 septicaemic symptoms appeared and a blood culture revealed the presence of *Staph. aureus*. This infection was treated with sulphathiazole and staphylococcal antitoxin, and after twelve days of pyrexia and rigors the condition resolved. No heparin therapy was given on this occasion for fear of disturbing the normal mechanism of protective thrombosis. A septic anaemia was dealt with by means of blood transfusions, and the patient was discharged, well, on December 24.

Summary and Conclusion

A review of the subject of puerperal cerebral thrombophlebitis is given, and a case successfully treated by heparin is recorded.

The introduction of heparin gives us an effective weapon to treat what has invariably been a fatal complication of the puerperium, and the clinician's reward for an early diagnosis will be the survival of the patient rather than the sterile pleasure of making an accurate diagnosis and confirming it in the post-mortem room.

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Medical Memoranda

Puerperal Cerebral Venous Thrombosis

The following case is worthy of record in view of the interest shown in the articles published by Drs. Martin and Sheehan (March 8, 1941, p. 349) and by Dr. Martin (October 18, p. 537).

CASE REPORT

The patient, a primipara aged 21, was admitted as an emergency case on March 2, 1941. She had not been seen antenatally. There was no history of previous pregnancies or illnesses. The expected date of confinement was March 17.

On examination she was confused to some extent; she had had two fits at 10 and 10.20 a.m. on the day of admission. These fits were diagnosed by her doctor as being due to eclampsia. During the previous twenty-four hours she had had headaches, blurred vision, and swelling of the legs. There was no history of epigastric pain or abnormal micturition. The membranes may have ruptured three days previously. Morphine 1/4 grain had been administered before admission. The pulse was 90, the temperature 98° F., and the blood pressure 160/128. The urine boiled solid with albumin. There was no oedema of the legs. The heart and lungs were normal. The uterus was equal in size to that of a thirty-six-weeks pregnancy. The position of the foetus was L.O.A., and the head was not engaged. The foetal heart was heard.

Treatment for eclampsia was instituted along the lines recommended by Stroganoff (prior to the magnesium sulphate treatment). From March 3 to 7 the patient had no fits, the blood pressure was about 165/115, the intake and output of fluid were satisfactory, the pulse remained about 80 to 90, and the temperature was normal. Esbach's albuminometer reading was 14 on the day of admission and 2½ on March 7.

Induction of labour by medical means was begun on the 7th, and labour started at 6 p.m. on the 8th. It continued normally until 4.50 a.m. on the 9th, when the membranes ruptured. At 5 p.m. the same day the cervix was fully dilated. After two hours forceps were applied under ether anaesthesia and a macerated foetus of 5 lb. was delivered. The third stage of labour was normal. The general condition of the mother following delivery was good.

For the first three days of the puerperium the temperature in the evening was about 100° to 101° F., and the pulse ranged between 100 and 120. The general condition of the patient was fairly satisfactory. The blood pressure was 135/90, and the output of urine was good. The lochia were slightly offensive and of normal quantity and colour. Involution of the uterus was normal. A throat and cervical swab revealed no haemolytic streptococci. The urine contained a large amount of albumin, some pus cells, and a pure growth of non-haemolytic streptococci. At 10.15 a.m. on the fourth day of the puerperium (March 12) the patient suddenly went into coma. This lasted about twenty minutes and was followed by a confused state. There were no preceding convulsions, and on examination nothing abnormal was noted in the nervous system. A lumbar puncture was performed. The fluid was found to be under normal pressure, and laboratory examination revealed no abnormality. The blood pressure was 140/90, and there was some albumin in the urine.

On the 13th the patient was incontinent of urine and faeces and showed paralysis of the right arm and leg, with weakness of the right side of the facial and lateral rectus muscles. There was aphasia. The blood pressure was 136/96, and the Esbach reading was 1. The temperature rose in the evening to 100° to 101° F., and the pulse was about 110 for a week; both settled down by the twelfth day of the puerperium.

During the next week speech returned and the incontinence passed off. There remained a residual paralysis of the right arm and leg. Massage and exercises were then carried out, and the patient's movements returned to some extent. The leg improved more rapidly than the arm, and six weeks after the initial coma the patient was walking about. She has been seen periodically since discharge, and more movements of the limbs could be carried out, but they showed the characteristics of an upper motor lesion of the left side of the brain.

Pathological investigations revealed the following data. March 22, Wassermann and Kahn doubtful; March 27, Wassermann doubtful, Kahn negative; April 17, Wassermann weakly positive, Kahn positive (weak); Oct. 18, Wassermann doubtful. (On Oct. 17 the husband's Wassermann reaction was negative.) The urine on April 16 showed a large amount of albumin, with no pus, red cells, or casts. On March 19 a full blood examination had been carried out, and the only abnormality was a haemoglobin of 64%.

DISCUSSION

The lesion is obviously a vascular one. Among the possible causes is haemorrhage due to hypertension associated with eclampsia. This can be excluded, since the blood pressure was down when the coma occurred; also, cerebral haemorrhages associated with eclampsia generally occur during the eclampsia. The patient showed no cerebral symptoms for eleven days after her eclampsia. In addition, patients who get cerebral haemorrhages during eclampsia usually die at the time. Lastly, it is doubtful whether eclampsia occurs after the first day of the puerperium. An embolus passing through a congenital opening from the right to the left side of the heart is a possibility, but it is very rare and is usually fatal. A rupture of an aneurysm of the circle of Willis is also a possibility, but there was no blood in the cerebrospinal fluid, and such a rupture would not produce a hemiplegia of this type.

It seems fairly certain that thrombosis of a vein occurred somewhere on the frontal lobe, as there were no localizing signs at first. Then followed the extension of the thrombosis to one or more veins over the Rolandic area which produced the hemiplegia. The aetiology of this condition has been discussed by Martin. He suggests that fragments of clot may pass from the pelvic veins, if they are thrombosed, into the vertebral venous system. This possibility cannot be excluded in the

above case, since there was evidence of some pelvic sepsis. It would be of interest to know if cases had been reported of this condition associated with pelvic thrombosis arising out of other conditions—for example, post-operative pelvic thrombosis.

My thanks are due to Dr. W. I. B. Stringer, acting medical superintendent of County Hospital, Chatham, for permission to publish this case.

J. JOSEPH, M.B., Ch.B., M.R.C.O.G.
Formerly E.M.S. Physician, County Hospital, Chatham.

Primary Thrombosis of Cerebral Veins in the Puerperium

In view of the articles by Drs. Martin and Sheehan and by Dr. Martin the following case report should be of interest.

CASE RECORD

The patient, a woman aged 29, was admitted to Lewisham Hospital on October 23, 1941, with severe anaemia following post-partum haemorrhage, which had occurred at home two weeks previously, after her second confinement. There was no history of epilepsy or of previous illness. Her haemoglobin was 32% and her blood pressure 134/80. There were no other abnormal physical signs. A blood transfusion on October 23 did not give rise to any abnormal reaction. On October 26—i.e., the seventeenth day of the puerperium—three epileptiform convulsions occurred. There was a fourth convulsion on the following day. No aura or cry preceded the convulsions, which were generalized, and the patient regained consciousness in the interval between them. She complained of severe frontal headache, which persisted for some days; she also vomited.

On examination the cranial nerves were normal; there was no papilloedema but some congestion of retinal veins. Astereognosis of the left hand was present, but no other sensory changes. There was no loss of motor power. All deep reflexes were exaggerated. The right plantar response was flexor, the left doubtful. The blood pressure was 116/76. There was no venous thrombosis in the legs, and the other systems were normal. Examination of the C.S.F., which was under pressure of 170 mm. and slightly blood-stained, showed: total protein, 40 mg. per 100 c.cm.; globulin, *nil*; chlorides, 740 mg. per 100 c.cm.; lymphocytes, 1 per c.mm.; polymorphs, 2 per c.mm.; red blood cells, 5,000 per c.mm. Examination of the blood revealed: urea, 25 mg. per 100 c.cm.; negative Wassermann reaction; haemoglobin, 60%. Albuminuria appeared, persisting for three days. On October 28 the C.S.F. pressure was 160 mm. and the fluid was still blood-stained.

During the ensuing two days the headache became less severe, but there was still occasional vomiting. Papilloedema did not appear. Astereognosis and gross incoordination of the left hand persisted for about a week. There was mild pyrexia for several days. Luminal, sodium sulphate enemas, and intravenous injections of 50% glucose were given. On November 22 a review of the central nervous system revealed no abnormality apart from generalized brisk deep reflexes. The patient was discharged cured on November 29.

Comment.—The clinical features of this case seem to follow closely those described by Dr. Martin. The fits occurred on the seventeenth and eighteenth days of the puerperium, the C.S.F. contained some blood, and there was slight pyrexia and transient albuminuria. These findings associated with the presence of astereognosis pointed to a lesion of the parietal cortex. As other causes of convulsions had been excluded, the diagnosis made was primary thrombosis of a vein over the right parietal cortex.

We wish to thank Dr. Allen Daley, Medical Officer of Health, London County Council, for permission to record this case.

D. R. CAIRNS, M.B., B.Ch., M.R.C.O.G.,
Senior Resident Obstetrician and Gynaecologist.
G. MELTON, M.D., M.R.C.P.,
Lewisham L.C.C. Hospital. Senior Resident Physician.

W. F. Keller (*J. Oklahoma State med. Ass.*, 1941, **34**, 519) records five cases of acute otitis media in children aged from 11 months to 11 years, in which characteristic diphtheria-like bacilli were found in direct smears or cultures of the ear discharge. All showed immediate improvement after injection of diphtheria antitoxin.

Reviews

CARDIAC CASE RECORDS

Cardiac Clinics. A Mayo Clinic Monograph. By Fredrick A. Willius, B.S., M.D. (Pp. 276; illustrated. 20s. net.) London: Henry Kimpton. 1941.

Case reports commonly make tedious reading. They consist so often of the bald recital of facts in the history, examination, and investigation of a patient that most readers of medical literature have an instinctive aversion from them. Dr. Fredrick A. Willius, in this volume of *Cardiac Clinics*, accepts the initial disadvantage that it comprises essentially a collection of case records. Whereas such reports are frequently lumped together in an appendix, they form here the very substance of the work. The author has succeeded in surmounting this disadvantage because of the effort which has been expended in making the records readable and in elucidating their significance in well-written discussions on differential diagnosis and treatment. The cases have been chosen from the material of the Mayo Clinic and grouped to form representative examples of the various types of heart disease and disorder; they are supplemented by verbatim accounts of discussions which took place at the time the cases were seen at the Clinic.

The main substance of the work has been amplified by the interpolation of concise articles showing how the inferences drawn from the case reports accord with the basic principles of cardiology. Thus cases of aortic disease are followed by an article on calcareous aortic stenosis, while a section on coronary disease is followed by chapters on the healing of cardiac infarcts, the differential diagnosis of coronary thrombosis, and cognate subjects. Among miscellaneous topics included in a valuable final section of the book are surgical procedures in relation to heart disease, embolic manifestations, complications in the management of congestive heart failure, the misuse of medical terms, and the philosophy of convalescence. Historical appraisals of the work of Harvey, Malpighi, and Morgagni rather surprisingly find their way into this work. They, among many other things, will be appreciated by those who read its parts as they should be read, at random and not consecutively.

CARE OF THE AGED

The Care of the Aged (Geriatrics). By Malford W. Thewlis, M.D. Third edition, entirely rewritten. (Pp. 579; 50 illustrations. 30s. net.) London: Henry Kimpton. 1941.

A third edition of this book has appeared seventeen years after the second and has been largely rewritten. That there are many medical problems pertaining to old age, and that many illnesses as they occur in the aged differ in symptomatology, course, and treatment from their normal characteristics, no one will deny. Whether, however, it is necessary to set up a new specialty of "geriatrics" some may take leave to doubt. Be this as it may, a book of reference relating to old age and its diseases must be useful if it is reliable, well arranged, and readable. The present volume fulfils all of these requirements, though it would be easy for anyone with special interests to criticize, inasmuch as his own pet subject may not appear to have received sufficient attention. This, however, is not really a valid complaint since a full list of references is given at the end of each section.

The book is divided into five sections. The first deals with general considerations, including historical notes, general hygiene, the importance of occupation and hobbies, and medico-legal questions such as testamentary capacity,

undue influence, etc. The second section approaches "Miscellaneous Medical Problems," such as the anatomical and physiological changes attending old age, general therapeutic considerations including diet, exercise, and nursing. The third section deals with infectious diseases, and the fourth with "non-infectious diseases"—a section which includes such diverse matters as allergy, alcoholism, and focal infection. Finally the diseases of the various systems are dealt with seriatim as they appear in old age, with a final chapter on the surgery of the aged.

As a book of reference this volume should have a place on the shelves of all general physicians, and if anyone considers it worth his while to specialize exclusively in geriatrics he will no doubt use it as a vade mecum—at least until he writes a rival volume himself.

TELLING THE YOUNG

The Parents' Problem; or, How to Tell Children about Sex. By R. Macdonald Ladell, M.B., Ch.B. Practical Psychology Handbooks, No. 19. (Pp. 48. 1s. net.) London: The Psychologist, 1, Southampton Street, W.C.2.

Letters to Margaret. By Theodore Faithfull, formerly Principal of the Priory Gate School. (Pp. 160. 5s. net.) London: George Allen and Unwin, Ltd.

Dr. Ladell's new member of the shilling handbooks on practical psychology is an excellent brochure which really does tell parents "how to tell children about sex," and that in only 48 pages of straightforward writing and clear print. The main difficulty—the parent's own self-consciousness and half-guilty embarrassment—is recognized at the beginning. In our experience this difficulty often remains insuperable, because emotional; but honest folk will find guidance in the simple scientific good sense wherewith it is tackled here. Masturbation is also well discussed. A guess may be hazarded that the sense of guilt that goes with this may depend on something deeper than a connexion with the excretory functions; on, in fact, a racial instinct which tends to preserve the generative functions. On the general subject of his tract Dr. Ladell writes: "The aim of instruction is to get the child to accept sex as a normal part of its own nature, and of life. Upon the basis of facts it will build its own emotional life, and it is our duty to present these facts without bias." From this satisfactory statement may be gathered the tone of the booklet.

The idea of Mr. Faithfull's book is excellent. Twenty-three letters, lofty in tone, originally written at intervals for a girl aged 12 at the beginning, deal with the developments which she must expect in her mind and body. Postulating a knowledge of biology, Mr. Faithfull teaches that the psyche consists of male and female elements. These will, in the course of adolescence, produce symptoms and sensations about which she is being informed beforehand. It is demonstrable that faults in character arise from anchoring of either element at a more primitive stage than that reached by the other. This kind of explanation has, in the author's experience, proved helpful to adolescents he has known in their struggles towards complete integration. Mr. Faithfull holds extreme views. "Boys often transfer the worries about the unsuitability of their sex organs to the eyes and in doing so distort their vision. In the same way a girl tends to transfer the tension in an undilated vagina to her eyes, nose, and throat. . . . In place of the natural lubricant in a non-active vagina an opaque semi-solid substance accumulates; for this reason many mothers of to-day take their daughter to a doctor with the request that the vagina be given the required dilatation. Some African tribes extend the ceremony by . . ." and here follows a description of the clitoris and its excision. While agreeing with the author that better understanding of our own complex psyche is very desirable as a stepping-stone to greater happiness, most of us would hesitate to put this book as published into the hands of an adolescent. Nevertheless, the letters do give a lead to parents and teachers, who should be able to deal with the problems and help with the struggles of boys and girls from puberty onwards.

Notes on Books

Dr. CHARLES HILL'S popular talks in the "Kitchen Front" broadcasts are now available in pamphlet form, issued for the Ministry of Food by the Ministry of Information and entitled *Your Baby's Food in War Time: The First Year.* The chatty, almost rollicking style reads as well as it sounded over the air, and medical practitioners can recommend this with confidence to all mothers, prospective or factual. Dr. Hill's facts everywhere appear to be sound, with one curious exception—why no potatoes until a year old? It is a great credit to the author that careful reading has failed to reveal any other point which a paediatrician can justifiably criticize. The pamphlets are sold at 3d. each or 10s. for 50.

In *Science and Human Prospects* Prof. ELIOT BLACKWELDER, as a geologist, reveals himself as no supporter of the monogenetic theory of man's origin. He believes that there were at least five, and probably more, species originating in various parts of the world, living many tens of thousands of years, and then, with one exception, all becoming extinct. He asks the question, Will our own species also reach its climax and then deteriorate? A pertinent question in view of the present relapse into barbarism. He reminds us that the ancestral mammals did not spring from the most advanced dinosaurs, while the anthropoids evolved, not from higher mammals, but from humble insectivores. On that analogy he suggests that the progenitors of the newer and better man, so badly needed, may develop in obscurity while the modern races contend with each other for a transient supremacy. But the existing races will only be outstripped by the development of a brain of higher quality. One wonders, however, where in the world of to-day such an oasis of obscurity could be found. Naturally, as a geologist, Prof. Blackwelder takes a long view of any such possibility, and his essay is not only speculative but suggestive. It is published at 6d. as No. 19 of The Thinker's Forum Series by C. A. Watts and Co., Ltd.

The Principles and Practice of Gaseous Anaesthetic Apparatus is by Mr. A. CHARLES KING, and Dr. I. W. Magill contributes a foreword. This handbook by a well-known manufacturer of anaesthetic apparatus contains much useful information on the care of equipment. The book opens with a short note on the history of anaesthesia. The manufacture of nitrous oxide and oxygen is then simply described and the methods by which gases stored under high pressure in cylinders may be safely released are explained and illustrated. Diagrams illustrate the different types of flowmeters and anaesthetic apparatus in regular use. Doctors, nurses, and technicians engaged in this specialty will find the book interesting and helpful, and the blank pages at the end of it for notes will be appreciated. It may be had free on application to A. Charles King Ltd., 27, Devonshire Street, W.1.

The frequency with which pain in the region of the heart, palpitation, and disorder of breathing denote heart disease is still too widely overestimated. Dr. DORIS M. BAKER, in her *Cardiac Symptoms in the Neuroses*, has reviewed the symptomatology of functional disorders of the heart, dealing with left inframammary pain, palpitation, and sighing respiration. It is remarkable how commonly this last symptom masquerades as heart disease not only in the eyes of the patient but also in those of his doctor. This authoritative and readable survey, obviously the outcome of thorough clinical studies, should be of great service to students and practitioners, especially as the material here presented is not given in so direct or useful a form in the average textbook of cardiology. It is published at 4s. 6d. by H. K. Lewis and Co., Ltd.

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ENCEPHALOMYELITIS IN NORTH AMERICA

The control of virus infection of the central nervous system is by no means simple in countries such as North America, where there are at least five widely distributed neurotropic virus diseases. Poliomyelitis, there is now increasing evidence to show, is probably spread in the same way as is typhoid, by faeces, flies, and contaminated food or water. Lymphocytic choriomeningitis seems to be an enzootic of domestic mice, which excrete the virus in their urine. More light has recently been shed on the epidemiology of the three other neurotropic virus diseases—St. Louis encephalitis, and eastern and western equine encephalomyelitis. For a considerable time it was thought that St. Louis encephalitis was a purely human disease transmissible in the laboratory only to the white and meadow mouse and the golden hamster; nothing was known of its normal method of spread. There is, however, evidence to suggest that the mosquito *Culex pipiens* may have been implicated during the 1933 St. Louis epidemic, and Casey and Brown[1] have brought forward statistical evidence that the disease was specially prevalent around St. Louis in areas favourable for mosquito propagation. Mitamura and his co-workers,[2] in fact, claim to have obtained experimental transmission of the St. Louis virus by *C. pipiens* under laboratory conditions, though Fulton and his associates[3] in St. Louis were unable to confirm these results.

Equine encephalomyelitis, although it is known to exist in two forms—an eastern and a western, which do not cross-immunize—was thought, as the name implies, to be confined to horses alone. Under laboratory conditions a number of Aëdine mosquitoes had been shown capable of transmitting the eastern and western viruses, but under field conditions no mosquitoes had ever been found infected, although a study of the possible vectors of equine encephalomyelitis in Massachusetts by Feemster and Getting,[4] and by Getting,[5] had brought strong evidence in support of the mosquito transmission theory. Thus in 1938 the known mosquito vectors were most prevalent late in August just before the peak of the outbreak of equine encephalomyelitis: two fresh-water breeders—*Aëdes vexans*, a ubiquitous species difficult to control in rural areas, and *A. triseriatus*—were both present in all those places where the disease was prevalent in 1938, while along the coast the salt-marsh species, *A. cantator* and *A. sollicitans*, may have been vectors. In this same year a number of workers brought forward evidence that both the eastern and the western forms of equine encephalomyelitis were producing a highly fatal encephalomyelitis in man—chiefly in infants and children (Fothergill *et al.*,[6] Webster and Wright,[7] and Feemster[8]). During the outbreak Fothergill and Dingle[9] isolated the eastern type of virus from the brain of a pigeon that had died in Massachusetts, in an area where cases were occurring in horses, while Tyzzer, Sellards, and Bennett[10] obtained the same virus from the brains of ring-necked pheasants from Connecticut.

For a number of years occasional cases of encephalitis have occurred in the summer months in human beings in the Yakima Valley in the State of Washington, U.S.A. In 1939 the number of these cases first reached epidemic proportions, while during the same period deaths occurred sporadically and in small outbreaks among horses, generally attributed to forage poisoning, botulism, or "blind staggers." In 1939 some 600 cases of encephalomyelitis were seen in horses together with 31 cases of encephalitis in man. In 1940 encephalitis again appeared in epidemic and epizootic form in man and horses. This outbreak was investigated by Hammon,[11] and a similar occurrence in Weld County, Northern Colorado, was studied by Philip, Cox, and Fountain.[12] The results of these observers (Hammon,[11] and Philip, Cox, and Fountain[13]) were surprising, for an examination of sera from men and horses showed that two diseases were present—western equine encephalomyelitis and St. Louis encephalitis. In the Yakima Valley neutralization tests performed on the blood sera of 50 patients with a definitely established clinical diagnosis of encephalitis showed that 43 neutralized the western equine virus and 36 the St. Louis virus, while 28 neutralized both viruses. Of 75 sera from apparently normal people in the same area 3 were positive for the western equine virus, 19 for St. Louis virus, and 2 were positive for both. Philip and his colleagues[13] obtained similar results, and were able to show that both western equine encephalomyelitis and St. Louis encephalitis were present in Colorado in 1938, 1939, and 1940, not only in man but in horses. Sera from horses recovered from encephalomyelitis in Montana also contained immune bodies to both viruses. Here it is interesting to note that veterinary surgeons have reported that horses not infrequently suffer from reinfections with encephalomyelitis in the western States. Next, Cox, Philip, and Kilpatrick[14] demonstrated that horses injected intracerebrally with St. Louis virus suffer from clinical symptoms like those induced by western equine encephalomyelitis virus, thus confirming an almost forgotten observation made by Muckenfuss in 1934.

As originally shown by Cox and Fite[15] there is no cross-immunity between the St. Louis virus and those of equine encephalomyelitis, and Howitt[16] has recently found that from monkeys inoculated intracerebrally with St. Louis and western equine encephalomyelitis viruses both may be recovered: there is thus no interference between the two viruses, though neutralizing antibodies against the St. Louis virus were later in appearance than those against the equine virus. Both viruses were present in the peripheral blood stream of the monkey—an important fact, because Hammon and his colleagues[17] have now shown that wild *Culex tarsalis* mosquitoes caught in an epidemic area harbour both viruses. The two viruses thus have the same insect vector, and it would also appear the same animal reservoirs, for Hammon *et al.*[18] have found immune bodies to both viruses in the blood of domestic birds and animals (duck, goose, pigeon, turkey, cow, dog, goat, pig, and sheep) as well as in the blood of wild birds and animals (quail, ring-necked pheasant, sparrow hawk, red-shafted flicker, great-horned owl, white-footed mouse, field mouse,

1 *Science*, 1938, **88**, 450.
2 *Trans. Soc. Path. Jap.*, 1937, **27**, 573.
3 *Proc. Soc. exp. Biol.*, N.Y., 1940, **44**, 255.
4 *Amer. J. publ. Hlth.*, 1941, **31**, 791.
5 *New Engl. J. Med.*, 1941, **224**, 999.
6 Ibid., 1938, **219**, 411.
7 *Science*, 1938, **88**, 305.
8 *Amer. J. publ. Hlth.*, 1938, **28**, 1403.
9 *Science*, 1938, **88**, 549.
10 *Science*, 1938, **88**, 505.
11 *J. Amer. med. Ass.*, 1941, **118**, 161.
12 *J. Parasitol.*, 1940, **26**, Suppl. 24.
13 *Publ. Hlth. Rep.*, Wash., 1941, **56**, 1388.
14 Ibid., 1941, **56**, 1391.
15 *Proc. Soc. exp. Biol.*, N.Y., 1934, **31**, 499.
16 *J. Immunol.*, 1941, **42**, 117.
17 *Science*, 1941, **93**, 328.
18 Ibid., 1941, **94**, 305.

jack and cotton-tail rabbits, black and brown rats, and weasel).

It thus appears that the oecology of St. Louis encephalitis and that of western equine encephalomyelitis viruses are closely akin though the two diseases are entirely distinct. A similarity occurs in the coexistence, often in the same institutional outbreak, of influenza A and B viruses. There is, however, evidence that equine encephalomyelitis may exist alongside of another neurotropic virus infection. According to recent reports[19] from Canada, Manitoba, Saskatchewan, and Alberta have suffered from twin epidemics of anterior poliomyelitis and western equine encephalomyelitis which began in mid-July of last year and continued into September. Concurrently with the outbreaks a substantial number of cases of encephalomyelitis have been reported in horses. The encephalomyelitis is believed to have spread northward into Manitoba from Minnesota and North Dakota. If western equine encephalomyelitis is marching north it appears equally true that the eastern form is going west, like the pioneers of old. According to Randell and Eichhorn[20] the Appalachian Mountains no longer form the dividing line between the eastern and western forms of equine encephalomyelitis. Is further spread of these virus infections possible?

PREVENTIVE PAEDIATRICS

The great reduction in infant mortality during the past half-century in this country is a much-quoted advertisement for the improvements achieved by the growing public health system during that period. But, like most advertisements, it skilfully avoids comparison with rival firms, so to speak, and it will therefore come as a salutary shock to many to learn from Prof. Charles McNeil's contribution on another page that in Holland, where the infant mortality rate in the eighties of last century was much higher than that for England and Wales or for Scotland, the position to-day, or at any rate for the last undisturbed years, is far better than in these islands. International comparisons of figures of this kind have to be made with great caution, but Prof. McNeil's careful analysis leaves little doubt that in Holland the infant death rate per 1,000 live births in the three-year period 1936-8 was less than half what it was in Scotland and a fraction over five-eighths of the rate for England and Wales. The actual figures for that period —the last in which peaceful and stable conditions made possible any international comparison of vital statistics— were 37, 77, and 56 respectively. These figures are a challenge to complacency, and Prof. McNeil skilfully analyses the position and points the way to those improvements which the British system needs to bring it nearer to the Dutch in its achievements.

The outstanding cause of the British lag in preventive paediatrics appears to be "a lack of knowledge on the part of nurses and doctors responsible for the welfare of infants after birth." Education of the preventive health services is therefore the solution. The curriculum and training of health visitors must be drastically overhauled and improved, and with the better training of nurses there must also be better training for the family doctor and the welfare clinic medical officer. Such work of training, writes Prof. McNeil, "seems to lie in the hands of physicians in the teaching children's hospitals." It is a serious indictment of the public health system that hospital paediatricians with "the deepest clinical experience of the child" are in fact so neglected that Prof. McNeil has to write that "their experience is used very little in the preventive service."

A scheme for "child health training schools" is outlined in some detail in the contribution published this week: the eight points there elaborated contain the essence of paediatrics as it should be practised, essentially as a preventive service. After education of the doctor and nurse must come education of the mothers, and here those who belittle "clinics"—and there are many, medical and lay—will note that all the emphasis is laid upon instruction in the home. The key person in this part of the scheme is the trained health visitor, giving instruction to the mother in the home under the supervision of the family doctor and also carrying out his directions in the treatment of ailments and illness at home. One of the developments in Holland noted by Prof. McNeil is the work of voluntary societies specializing in education of mothers in the home. What is needed in Britain is just this reorientation. The public health nurse must become the home health visitor with all the backing that can be given her by the family doctor—much better trained in paediatrics, especially in infant dietetics—and by the paediatrician. Prof. McNeil's comparison with Holland leads him to conclude that "our preventive paediatrics is second-rate." Those who seek to teach the mother how to look after her child must themselves be better taught and trained.

DECLINING POPULATION

Recent correspondence in the *Journal* on the highly important matter of the birth rate suggests that it may be worth while to put on record some of the facts. The decline in the birth rate began during the decade 1870-80. The rate of decline has not been uniform, and the period covered by the downward trend can be divided into two approximately equal parts. The first covers the thirty years 1870-1900, during which the birth rate fell by 20%; the second period, from 1900 onwards, has witnessed an accelerated fall and a reduction of 50%. As a result of this downward trend the legitimate birth rate per 1,000 married women aged 15-45 in the triennial period 1930-2 was less than half of the value of 1870-2. The rate of decline did not affect all classes of society alike, and perhaps the most serious aspect was the big decrease among the more affluent classes, who could best afford a large family. The large variation in fertility that exists among married women was shown in the completed fertilities of the 1911 fertility report: one-quarter of the wives, with large families, contributed over one-half of the child population; at the other end of the scale one-third of the wives had only one-twentieth of the children.

Concurrent with the fall in the birth rate there was a decline in the death rate: in the decennial period 1861-70 the death rate was 22.5 per 1,000 and the birth rate was 35.2 per 1,000; in the period 1921-31 the death rate had fallen to 12.1 and the birth rate to 18.3. As a consequence of the decline in the death rate the rate of growth of the population was not at first materially changed; the decennial rate of increase of the population varied between 11% and 14% during 1871 to 1911 but fell to 4.93 in 1921 and 5.52 in 1931. The improvement in the death rate has occurred mainly at the younger ages and to a less extent in middle life. The older age groups will affect the general death rate proportionally more as the proportion of the population in these groups is increased. The percentage of the population aged 60 and over increased from 7.42 in 1861 to 11.56 in 1931. This changing age constitution must necessarily check the decline in the death rate, and there is a suggestion in the values published in the 1931 decennial supplement of the Registrar-General that the rates of mortality at advanced ages were increasing, possibly as a sequel to the ageing of the population.

[19] *Canad. med. Ass. J.*, 1941, **45**, 351.
[20] *Science*, 1941, **93**, 595.

That a continued fall in the birth rate would eventually lead to a decreasing population, and the possible economic consequences of this, have been discussed many times. During the last decade the birth rate has remained below the level necessary to maintain a stable population, and this critical position has focused attention on the probable maximum size of the population and the date by which it would begin to diminish. Various estimations have been made, and, although they differ because of the varying hypotheses on which they were based, a decline in the size of the population was generally regarded as inevitable. Dr. Percy Stocks in his letter to this *Journal* (March 21, p. 394) advances sound reasons for discounting these estimations, and suggests that it is not certain that the population will diminish and that it is still possible to avert a decrease. There has been a large increase in the population of young married women as a result of war conditions, and although the birth rate has been slightly depressed at present there may well be a very substantial rise in the reproduction rate of women as a whole after the war. But whether the size of the population shrinks or not, it is certain that in future it will contain an increasing proportion of older people.

PULMONARY ABSCESS

A recent paper by Touroff and Neuhof[1] goes a long way towards explaining the difference of opinion found in the literature about the efficacy of various forms of treatment for lung abscess. The explanation is based on differentiating two varieties of abscess: putrid and non-putrid. In a putrid abscess the infection is apparently by anaerobic bacteria. It begins as a localized area of gangrenous pneumonitis, which results, presumably, from the aspiration of infected matter from the mouth or upper respiratory passages. The material becomes arrested in one of the smaller bronchi or bronchioles; the lesion is therefore situated in the periphery of the lung. Rapid necrosis follows, and within a week of the onset of infection radiography often shows already a unilocular cavity surrounded by only a narrow zone of infiltrated atelectatic lung. An intense overlying pleuritis is present. The sputum or breath is characteristically fetid. A non-putrid abscess is initiated by aerobic organisms and begins as an area of bronchopneumonia. The expectoration after a variable interval of frankly purulent non-fetid sputum indicates that the pneumonic process has become suppurative and necrotic. Various changes may result in the non-putrid abscess assuming any one of four forms: (1) excavation in the midst of an extensive area of inflamed, suppurating, and necrotic lung; (2) the same as in (1) but with excavation more advanced; (3) typical pulmonary abscess surrounded by a narrow rim of pulmonary infiltration (like that noted in cases of putrid abscess); and (4) multiple scattered lesions of the above three types in various combinations. The authors emphasize the importance of fetor of the sputum or breath (there may be no sputum if the draining bronchus is blocked), and in the differentiation of the two varieties of abscess advise diagnostic bronchoscopy for the detection of fetor when a doubt concerning this exists. Acute putrid abscess subsides much less often under conservative treatment than does acute non-putrid abscess of Type 3, which it resembles. The explanation is probably to be found in the different causative organisms. On the basis of the above classification Touroff and Neuhof give clear indications for therapy. The treatment of putrid abscess is essentially surgical, whereas that of a non-putrid abscess is essentially non-surgical. Non-putrid pulmonary abscesses of Types 1, 2, and 4 show the same tendency to respond to conservative treatment as Type 3, and should be treated by these methods. Some cases, however, fail to respond to conservative treatment, but in these circumstances surgery not only is of no value but may prove harmful. Surgical treatment is indicated in non-putrid abscesses of all types when the lesion is complicated by perforation of the pleura. Finally, operation may also be indicated in non-perforated Type 3 abscess when the clinical manifestations are severe and persistent and radiological evidence supports the clinical impression of an advancing lesion. The accurate differentiation of this common chest condition on the basis of this report is significant for both physician and surgeon. The chest surgeon will be particularly interested in a method recently described by Rabin[2] of precisely localizing a pulmonary abscess by the "spot" method. This consists in establishing a fixed spot in the intercostal muscle recognizable on the radiograph and at the operating table. The mixture injected is 40% iodized oil and 0.5% methylene blue.

[1] *J. thorac. Surg.*, 1941, **10**, 618.

PLANNING THE MENTAL HOSPITAL

A pamphlet has been issued by the Board of Control for the guidance of local authorities in planning mental hospitals.[3] It is as matter-of-fact as a builder's specification, and only when one recalls what the institutional treatment of the insane was like less than a hundred years ago, and how recent is the humane and scientific care of these unfortunates, does its import as an official document become apparent. The Board of Control disclaims any wish to interfere with local authorities, to stereotype design, or to hamper the evolution of new ideas, but the suggestions it makes are the fruit of practical experience on a national or even international scale. It is perforce advisory and not mandatory: at least so far as the choice of site is concerned, few local authorities would be able to meet all the requirements. The site should be in rural surroundings, on ground readily drained, not unduly exposed, with a general fall south or south-west or south-east, near a main road, but not intersected by public roads or rights of way, or situated over mine workings, or near a source of danger such as river or railway, readily accessible from industrial centres of the area, within reach of a town, but in a zone not likely to be developed for building, and with a soil suitable for general cultivation. On such an Eden a hospital of 1,000 beds, which is the recommended size, will require 150 acres, including space for enclosed gardens and recreation grounds. Of every 100 patients, ten may be expected to be recent and recovering, seven to be sick, sixteen to be disturbed and excited, seven to be senile and infirm, ten to be epileptic, twenty to be working on parole, and the remainder, an ill-defined group, to be quiet able-bodied patients but not on parole. These classes all need different accommodation. The buildings will include the administration block, an early treatment centre comprising a detached admission hospital for both sexes, and two homes for convalescents, a hospital for the sick, a unit for the excited and disturbed, villas for the senile and infirm and for cases of protracted mental disorder, and wards or villas for the other categories. The admission hospital will include a clinical laboratory with a medical library, a small dental room, the *x*-ray installation for the entire hospital, and rooms for hydrotherapy, physiotherapy, etc., while the treatment centre of the main hospital will contain the other rooms for the medical service of the institution, including the operating suite, dispensary, and con-

[2] *J. Thorac. Surg.*, 1941, **10**, 662.

[3] *Suggestions and Instructions for the Arrangement, Planning, and Construction of Mental Hospitals.* H.M.S.O. (6d. net.

sulting room for the medical staff. It may be necessary to provide occupational centres for about 15% to 20% of the patients, apart from those working in the departments, wards, and utility shops. Other buildings in the grounds will include residences for the staff, a nurses' home, church, sports pavilion, and farm buildings if farming be undertaken. The suggestions for housing the medical staff are equally explicit—the size of house and number of rooms for the medical superintendent, the smaller houses for his assistants, and the residential quarters in the administrative unit for the unmarried officers. In the general design of the building merely decorative effects are discouraged, but the emphasis is on therapeutic cheerfulness and, above all, on safety. It is advised that the buildings to house patients should not exceed two stories in height. Innumerable suggestions in regard to lighting, installation of telephones and bells, ventilation, water supply, heating, fire protection, drainage, are all set out in careful detail. The main object kept in view is the proper care of patients with due regard to economy.

DETECTION OF VITAMIN A BY FLUORESCENCE MICROSCOPY

The greenish-yellow fluorescence emitted by vitamin A when subjected to ultra-violet irradiation was first observed seventeen years ago by Japanese workers.[1] Peacock,[2] who independently discovered the phenomenon, noticed that prolonged irradiation causes the fluorescence to disappear and destroys the vitamin. The application of fluorescence microscopy to the study of the distribution of vitamin A in tissues was introduced by Querner.[3] The characteristic fluorescence was detected in the paraplasmic fat granules of the cells of the liver parenchyma, adrenals, pituitary, and retinal rods and cones. No fluorescence was seen in the tissues of rats given diets deficient in vitamin A.

Our knowledge of the distribution of the vitamin in both man and rat has been amplified by the recent extensive communications of Hans Popper, which are illustrated by many excellent photomicrographs. In an examination of specimens taken from over 200 human subjects at necropsy[4] fluorescence was found to be imparted by lipoids present in the following sites: in the epithelial and Kupffer cells of the liver; in the epithelial cells of the adrenal cortex; in the tubular and Leydig cells of the testicle; in the granulosa, theca-lutein cells, and in the cortical stroma of the ovary; in adipose tissue and fat cells; and in the glands of the breast during lactation. Great variations occurred in the amount of fluorescence in uninjured organs, and even greater in diseased organs. Fluorescence was seen in the kidneys only when diseased, and indicated pathological permeability of the glomerular loops. To supplement this investigation twenty-nine specimens of liver taken by biopsy during operation were examined.[5] The results confirmed those obtained with specimens taken at necropsy. After massive doses of vitamin A the fluorescence was much increased. Otherwise, except for prolonged starvation, the nutritional state or the vitamin A content of the diet immediately before the operation had little influence on the fluorescence, but injury of the liver cells caused much diminution. In jaundice, toxic oedema, and diabetes, fluorescence was seen in the Kupffer cells but not in the epithelial cells of the liver, suggesting a block in the exchange of vitamin A between these sites. From an investigation of 219 tumours from human subjects it is concluded[6] that fluorescence is present only when the parent tissue normally contains vitamin A. This finding may be of value in deciding the origin of tumours. Thus the fluorescence of the hypernephroma suggests that it originates from the adrenal.

In an examination of the organs of 237 rats' fluorescence was found in the epithelial and Kupffer cells of the liver; the fascicular layer of the adrenal; the interstitium of the kidney and lung; the interstitial cell cords and corpora lutea of the ovary; the pleura, pericardium, and peritoneum; the meninges; the retina and pigment layer of the eye; fat cells and the upper part of the small intestine during the absorption of the vitamin. Chemical tests for vitamin A were done on organs showing fluorescence, and a good correlation was found. Fluorescence was increased, particularly in the Kupffer cells, in rats given massive doses of the vitamin, and much reduced in animals deprived of the vitamin and in very young animals. The Kupffer cells of the liver and the endothelial cells of the kidney and lung were the last tissues to lose their fluorescence during deprivation, and the first to regain it on the restoration to the diet of carotene or vitamin A. They are probably concerned in the conversion of carotene to the vitamin. A special study was also made of the distribution of vitamin A in the eye of the rat.[8] In the ciliary processes fluorescence depended on the nutritional status, but was independent of the state of light-adaptation. In the pigment coat and in the rod-and-cone layer fluorescence was seen in the light-adapted eye, even when the animal was deficient in vitamin A, but no fluorescence was observed when the eye was dark-adapted.

The evidence accumulated in this careful research emphasizes once more the importance of the Kupffer cells in the storage of vitamin A, particularly when large amounts are included in the diet. Previous reports of the high concentration of vitamin in the adrenal capsule are confirmed. No fluorescence, however, can be detected in the mucous membranes, which are particularly vulnerable to deficiency of the vitamin; this suggests that the action of the vitamin on these tissues is of a secondary character. No doubt can be entertained as to the general reliability of the method. Its extreme delicacy, however, and the possible suppression of fluorescence by the presence of other substances capable of absorbing ultra-violet irradiation, may require some caution in the interpretation of the results in detail. Thus vitamin A is detectable in the light-adapted retina of the rat even in extreme deficiency, but no fluorescence can be seen in the dark-adapted retina of the well-nourished animal, which presumably contains more vitamin A, although in combined form as visual purple. No means of discriminating between the fluorescence of vitamin A and the yellow fluorescence of carotenoid pigments seems to have been evolved. It may also be noted that, whereas Popper has detected vitamin A only in pathological kidneys, Lawrie, Moore, and Rajagopal,[9] using the antimony trichloride method, have generally found more vitamin A in normal than in diseased kidneys.

1 *Inst. phys. chem. Res.*, Tokyo, 1925, **3**, 81.
2 *Lancet*, 1926, **2**, 328.
3 *Klin. Wschr.*, 1935, **14**, 1213.
4 *Arch. Pathol.*, 1941, **31**, 766.
5 *Arch. Surg.*, Chicago, 1941, **43**, 376.
6 *Arch. Pathol.*, 1941, **32**, 258.
7 Ibid., 1941, **32**, 11.
8 *Amer. J. Physiol.*, 1941, **134**, 114.
9 *Biochem. J.*, 1941, **35**, 825.

We publish at page 445 this week an article entitled "German Psychological Warfare," in which Dr. R. D. Gillespie describes a Survey by the American Committee for National Morale, of which the first edition was published in New York last year. Dr. Gillespie has returned from his visit to America for which he was granted leave by the Air Ministry to deliver lectures in the United States and Canada.

GERMAN PSYCHOLOGICAL WARFARE

AN AMERICAN SURVEY

[*The following article reviews a Survey by the American Committee for National Morale.*]

This Survey of German publications on the psychological aspects of warfare is of sufficient importance to make it desirable that its contents should be known not only to psychiatrists and psychologists in this country but, perhaps even more, to those who direct our war efforts. It makes clear the breadth and intensity of what might be called psychological organization of the German Army and people for war. It is evidence, too, of prolonged preparation dating from almost immediately after the last war—preparation for the war that was to come and is now in full swing, a war which many Germans regard as analogous to the Second Punic War, with Germany of course representing Rome and ourselves Carthage—two phases, in fact, of what is but one continuous struggle for power.

The detailed work is done, as one would expect from Germany, against a historical and philosophical background. The historical interpretations appear highly prejudiced to us, and would seem so to any dispassionate observer, if such a person exists any more anywhere in the world. The philosophy likewise is of an *ad hoc* brand; but these historical and philosophical studies together supply something that seems to be necessary to satisfy the German mind, serving its need for systematization, and adding thereby additional energy to the actions which its concepts at the same time are helping to justify.

Beginnings of a Plan for Revenge

The *primum mobile* of the whole movement since 1918 was the disappointment and humiliation at the result of the "First German War," to use a very apt term favoured by Mr. Harold Nicholson. There were "frantic efforts," as this Survey shows, to find reasons for that defeat that would save the precious prestige of the German Army. One of the most picturesque of these rationalizations was that defeat came about only through a nervous breakdown of Ludendorff's. There is no doubt that Ludendorff underwent a mental deterioration after the war. He had made public views about Catholics and Freemasons which could only be regarded as the product of a paranoid or morbid persecutory trend in him. But it would be a weak system, anyway, that had to depend so vitally on one man, and other explanations were more popular as sops to the injured German pride, such as stupid politicians, defeat on the home front, inadequate moral indoctrination of the population as a whole, as well as of the troops, making them, soldiers as well as civilians, over-susceptible to foreign propaganda. Upon this period of self-examination there followed very soon the beginnings of a plan for revenge. The German people, it was decided, "must undergo a long process of physical and mental redirection" for the second world war. The increase of the speed of battle by mechanization, the invention of new devices such as parachute troops, the perfection of co-ordination between different arms of the Services, were the leading tactical reforms advocated after much hard thinking. The recognition of the need for "unfailing nerves" in military leaders, and of the need to plan to this end, led to the organization of special training centres for picked young men; while the strategy of economic warfare was held to imply a special economic staff to mobilize industry and agriculture for mass production, to regulate the labour market, to manufacture substitutes, and to store materials of all kinds. Psychology was enlisted as an instrument of politics and diplomacy, and as "an instrument of military strategy."

The last, being the only means that was left to a defeated nation in the early years, was used first, and has been used increasingly ever since. It has played an enormous part, and in view of the German successes this surely has lessons for us. The fact that no scruples hindered its use does not mean that we cannot learn from the employment of it. In particular, at the present time we should note the immense value to their war effort of holding up to the German people the prospect of positive goals to work for and not merely of defensive views limited to self-preservation. Morale, built by whatever means, is considered by the German leaders to be at least as important as weapons. This is all the more impressive when we consider how important they have proved weapons to be. The second phase, of active economic rearmament, began to be added to morale-building in 1926 with the establishment of an economic general staff disguised as a "Statistical Society." Military rearmament naturally, as the Committee points out, came last, but the psychological aspect continued to be developed throughout and to be especially evident in the use of an offensive of its own, which has come to be known as the "war of nerves" and is arranged to take place between each "blitz" campaign.

To justify all these measures and to rationalize the naked desire for revenge and world domination which has been the ruling passion of at any rate the German leaders, if not of all their enslaved compatriots, a variety of pseudo-scientific philosophies, better called myths, were rapidly evolved. War was spoken of as an instinct; and biological sciences were raped to produce a moral justification for war: "Only the warlike nation deserves to survive," was their reading of Darwinism. This was embellished with German romanticism in the shape of the warrior as hero. Philosophically it was called realism. The political philosophy adopted conformed to the Machiavellian doctrine of might as right, a thing which any young Nazi encountered before the war could be found confidently to believe. Biology was dragged in again in the form of the mythical superiority of the Aryan race, and especially of the German branch. Economics were distorted into the "living space" philosophy (*lebensraum*) of Haushofer, a retired Bavarian general, head of the Military Academy at Munich; while the woolly-headed Rosenberg's "blood and honour" philosophy served as the representative of ethics. Politics were based essentially on power tactics. It was remembered in Germany but forgotten here that Clausewitz in 1916 wrote of war as the "continuation of policy by other means."

The uses of psychology were relatively neglected by Germany in the war of 1914-18. The High Command in that war called in the psychologists but usually disregarded their recommendations, although an aptitude test for aviators was introduced in 1916.

The Nazis, on the other hand, have regarded psychology as their most effective weapon. How far their success relative to the last war is to be attributed to this change is a matter of opinion, but in the case of France the Nazis' understanding of psychology appears to have been decisive. As a result of their employment of psychological methods against France, not only during the war but long before it, they were victorious, psychological devices being indeed the only ones used except in the final few weeks.

Psychological Methods in the German Army

As early as 1929 psychological methods were introduced into the German Army in a limited sense. A psychological laboratory was established by the High Command in that year. Psychologists were employed in increasing numbers in various ways:

(1) With the armed Forces in the selection of personnel for all branches, and especially for the selection of officers and specialist personnel, such as the Air Force and the Tank Corps. They were also used in connexion with propaganda among the troops—"indoctrination," as the Americans call it, meaning instruction in what war is about and what the Army is for; that is to say, political instruction of a limited kind. (2) On the civilian front they advised political leaders on methods of education for the heroic life, and on the management of public opinion. (3) In the foreign field they were expected to analyse the strong and weak points in foreign nations and to analyse foreign news, so as to help in shaping the Fuehrer's policy, as well as in the framing of psychological offensives.

More limited problems were also studied, such as homesickness among the troops. Other psychologists were engaged to produce, for example, the pseudo-"science" of the new German race—e.g., Jaensch, whose work even in the non-political field has always seemed to me to be curiously far-fetched and impractical. It is, however, an odd thing how practical these psychologists have managed to be in their collaboration with the political heads of the Nazi regime. Where they are themselves scientifically false the very falseness of their views is turned sometimes to clever account by the German propaganda machine.

The American Committee notes that even before the war there were already a hundred and fifty psychological testing stations throughout Germany as well as twenty-two psychological

laboratories in various universities and technical institutes. The qualifications required of psychologists are worth noting. They must have a Ph.D. with psychology as a principal subject; an all-embracing knowledge of the German military and cultural heritage; a personality that was expected to be gregarious, sensitive, self-controlled, warmly sympathetic towards youth and justice; and a complete devotion to psychological science. Their training consisted of three months in a psychological laboratory of the High Command, two years in the Army's psychological testing stations, six months of military training, and three additional months in the psychological laboratory of the High Command. Their examination comprised a thesis in psychological typology, an oral examination in characterology, and diagnosis, especially by the study of expression.

In spite of the exacting nature of the qualifications required of psychologists it is interesting to note that the military branch do not fully accept the need for psychologists in the Services; thus Van Seeckt denied the need for a special psychological service, holding that the "war lord" must himself be a good judge of men, and that Napoleon "was the greatest psychologist of all time."

Those who believed that psychologists had a definite place pointed out that the young officer generation must be taught to regard the soldier as having a mind of his own. It is worth noting that this tendency was much aided by the more democratic composition of the modern German Army as compared with its predecessors. The officers are very often drawn from the same social class as the other ranks (cf. Laird and Graebner's *Churchill's Britain and Hitler's Reich*). Notwithstanding opinions like those of Van Seeckt, a comprehensive organization already existed before the war. There was, for example, a central psychological laboratory for the High Command, with no fewer than twenty departments. The whole justification for the employment of psychologists in the selection of personnel is found in the statement that "masses of technical weapons are not themselves sufficient" to win a war. The Committee quotes from Hansen: "Our only hope for victory is based not on material but on mental superiority, achieved in the planned preparation of all human forces to multiply the fighting spirit of each soldier. . . . Mental superiority is contingent on the characterological make-up and the practical efficiency of leadership in high and low places. The selection of specialists has to go beyond mere examination of intellect and skill, and concentrate on the whole personality."

Requirements for Leadership

That the belief in leadership has been exalted in Germany to a foremost place in the political and Service organization is common knowledge, since Hitler is the supreme incarnation of this idea in the German mind. The Germans are very apt for this sort of organization, or, as we should call it, domination. Thus as early as 1920 Feder wrote: "The form of State best suited to the German character is civilian power centralized in the hands of one supreme leader." This notion was expanded to the international field with an appearance of the philosophical completeness so dear to Germans, so that Germany became destined in their minds to be a leader among nations.

The psychologist's task is the selection of leaders within the theoretically, but not really, classless society of the Nazi State. The political ideal of National Socialism is not at all realized in modern Germany, which in fact appears to neutral observers to be a kind of industrial feudalism, where the foremost leaders are certainly not chosen by psychologists but by themselves and by big business, which is said to be better off in Germany than in any other country in the world at the present time. The ordinary man lives in a kind of industrial serfdom (cf. Laird and Graebner, loc. cit.). Evidently the psychologist's task is limited in fact to the selection not of the highest leadership but of the minor leaders and the technicians. The specific qualities of a leader are laid down as positive will, determination, executive thinking, mental elasticity, strong character, integrity, selflessness, idealism, and well-controlled self-esteem. Particular attention should be called to the demand for mental elasticity. It may well be that this largely accounted for the Germans' tactical superiority over the French Army, the latter being devoted to principles of mathematical precision in its artillery manœuvres with, as it proved, a fatal loss of elasticity.

The emphasis on idealism has also to be remembered. It seems paradoxical to us, but it has always been one of the marks of the effects of Nazism on German youth, that while on the one hand it stimulated all the more brutal side of their nature, it has stimulated at the same time their idealism to a fanatical degree, partly because they were offered something positive to aim at and not merely the defence of existing rights, and partly because they were asked to sacrifice something all the time and were not asked to accept bribes to work harder. There again the Nazis showed their psychological insight on how to get the maximum effort out of human beings. The apparent contradiction in the qualities included in the Nazi product is shown in their cultivation, side by side, of automatic obedience on the one hand and individual initiative on the other. They themselves recognize the difficulty of reconciling these two qualities in one and the same individual, but they seem to have succeeded to a large extent—for example, in the quality of their tank crews. The psychologists and others who promulgated these requirements for leadership must be admitted, unfortunately for us, to have been reasonably shrewd. Any tendency to academic preciousness seems to have been balanced by a remarkable practical intelligence: thus it is recognized that self-estimation—in other words, conceit—is a handicap to leadership, and that fatigue in a leader must be counteracted in every way possible. It is probable that the arrogance so often noted in prisoners is confined to their attitude to what they have been taught to regard as inferior races and does not extend to their own comrades.

The recommendations about periodic rest for leaders show also the marks of common sense. The fact that mountain climbing, etc., may be recommended for what is predominantly mental fatigue shows that the German psychologists appreciate the value of diversion, even by dangerous stimuli. All this is part of their scheme for ensuring the superiority of leadership, which in their minds is absolutely indispensable. Intelligence, it should be noted, is regarded as the supreme ingredient of the successful leader. In the Air Force the D.Sc. in engineering, the hardest degree to get in Germany, is an indispensable qualification for the Higher Command.

Point is given to the introduction of new methods by the examination of the history of former wars. For example, in the rapidly successful campaign of 1870-1 only two out of the eight commanders with whom Germany began the war survived in office throughout the actual campaign.

Selecting Officers and N.C.O.s

In the selection of officers and N.C.O.s psychological tests are given only to those whose suitability had already suggested itself in field service. It should be noted that in a sense selection had already begun in childhood, for from the age of 6 a record is kept of the individual's performance and of his temperament and character during his life in the Hitler Youth and afterwards in the Storm Troops. A comprehensive characterological examination is regarded as an essential basis for selection. Special emphasis is placed on will-power, mental energy, staying-power, readiness to act to the limit of physical capacity, coupled with clear thinking and planned behaviour. Formal knowledge is regarded as secondary to spiritual and emotional qualities. Various techniques used include a comprehensive life history, analysis of facial and other expression under artificial stress such as pain and effort, and analysis of voice, appearance, and handwriting, and of gesture, movement, etc. The total time taken for the psychological examination and special psychological tests is two and half days in the Air Force and two days in the Army. It would hardly be possible after so long a time to avoid knowing a good deal about the candidate. The claim of 98% success in the selection for the Air Force would certainly be worth considering if something so intensive could be improvised in a war, which it cannot.

Naturally much attention has been given to the production of the desired qualities by education. Total education affords "a mental, spiritual, and physical conditioning of all ages, sexes, and classes" to act according to the principles of the Nazi State. In the schools, subjects are taught in accordance with the requirements of a military upbringing—e.g., arithmetic is taught in terms of military science. The Nazi teaching places its main stress on the inculcation of those characteristics which

will best serve the group. This is an ideal which in itself anyone might be glad to pursue. The training in general has its emphasis on heroic aims in life, and has some capacity to turn the naturally timid youth, whose existence the Nazis recognize, into a useful fighting-man. The very practical common sense of their training is shown once more in that the will to live is inculcated rather than readiness to die. Dying for its own sake as a kind of masochistic performance is discouraged. No mistaken pride is allowed to commit the German soldier to acts of bravery as ends in themselves.

The technique of conveying the necessary attitude to the troops includes education in political events designed to give a sense of participation in them; education in the history of Germany; what are described as "social evenings of comradeship," and other social meetings which imply music and community singing; the study of events in German national history; lectures by officers with battle experience; and planned recreation in the form of visits to picture galleries and the like. It should, however, be noted that, given the same kind of schooling in childhood and youth, individuals who thereafter were trained along Army lines rather than Nazi lines did better in battle.

The training of officers is concentrated in bringing out leadership qualities by developing a sense of determination and responsibility. The officer learns to be "a father to his company." While a large proportion of the officers are drawn from the middle and lower middle classes, the Army is not completely democratized, the higher ranks belonging to the traditional military caste. Nazi officials find it nearly impossible to get senior jobs in the Services. Each potential officer, however, of whatever origin, spends six months to a year in the military service, followed by a year in the Army, followed by a year in the ranks with a kind of father adviser in the person of a senior officer, and then two and a half years as an N.C.O. Attention is paid to teaching these officer candidates how to handle their men as human beings.

Quality, not quantity, is wanted; morons and the like are removed from the Army at once. The morale of conscripts presents special problems, and special efforts are made to cultivate it. Problems regarding promotion are carefully studied.

Psychology of Battle

Offensive war is regarded as the fulfilment of a soldier's life; defensive war is in the Nazi view a civilian idea. War is regarded as a struggle of efficiency and morale, and it is envisaged as requiring energy, skill, altruism, steadfastness, obedience, and the team spirit. The organizations used to cultivate these qualities are the German Society of Military Politics and Military Sciences, the Propaganda Ministry, and other organizations of the Nazis, including the Secret Police. Both mass and individual psychology are studied and used according to the indications. A keynote of morale in the German armed Forces is the privilege inherent in being chosen to be a soldier and to join the sacred fellowship of military men. Thus no guard-houses are maintained by the German Army. The very idea of one soldier guarding another is repugnant to the whole German military ideal. Instead, the offender is summarily dismissed from the Army. At the same time it is recognized that ideas alone are not enough; quality and quantity of equipment and the knowledge of adequate supplies are regarded as fundamental to the maintenance of sound morale. The soldiers themselves are invited to collaborate in suggesting modifications in design of equipment, thereby fostering the intelligent use of the mechanized arms.

The principal factors in impairing morale are fear, isolation, insecurity, deficiencies in changes in command, fatigue, defeat, losses, and idle waiting for enemy attack. It is recognized that soldiers suffering from neurotic anxiety are not necessarily cowards. Bombardment from the air is looked at more from the point of view of disintegration of enemy morale than from that of material destruction. To combat the same results in their own troops various measures are suggested, officers being even instructed to play up to religious feelings, which are found to be exaggerated during exposure to danger. The monotony of waiting is recognized as a special danger, and concerts, variety performances, organized radio listening, and so on, are all encouraged behind the lines.

Total War

The Committee points out that the word "blitzkrieg" was not coined by the Germans, but is a journalistic rendering of the term "offensive battle." The latter is but one phase of a longer war, which is not regarded as a whole as a "blitzkrieg" at all, but as something with phases of extreme activity interspersed with phases of relative quiescence and psychological offensives. In the actual technique of offensive it is the accepted rule that there shall be no formal declaration of war. The attack begins unheralded, with a superior force and at tremendous speed. The Air Force is concentrated on perhaps one single vital point, while parachutists and air-borne infantry are landed to destroy power stations, communication centres, bridges, etc. Surprise is regarded as essential, and there has to be an overwhelmingly superior attacking force with enormous reserves in the background, and this "blitz" phase has to show results within about fifteen days. All this is of interest, and presumably represents what would be used in an invasion of these islands as it has been used both by Germans and by Japanese elsewhere. But it should be remembered that military action is the last resort in the Nazi technique. Prophetically the writer Von Hentig, in 1920, predicted the "leader of the future as a military psychologist, a sort of aggressive pacifist, withholding the use of armed force until all other means of warfare have failed to realize his aims." The German leaders have proved that economic, political, and psychological attacks can be sufficient by themselves to win a war, or at any rate important phases of it, without resort to military action.

The preparation of civilians is regarded as almost as important as the preparation of fighting troops for total warfare. It is recognized that education has made great strides, and that the individual citizen is apt to be critical, so that an appeal to merely traditional forces is not enough. They believe that civilian morale can be made unassailable by the processes of education that have been alluded to. Himmler, however, considers that intimidation is one of the best methods. One of the bad features of the Nazi regime is the employment of 432,000 "morale-enforcing" agents—i.e., thirty-six S.S. divisions, each of 12,000 men, scattered throughout the country. This has its critics even in Germany. One writer remarks that it has become impossible to enforce people's will to sacrifice indefinitely. It is important perhaps to note that the removal or even the execution of high officials does not necessarily make a bad impression on the population. It is held that where high officials are impugned or even executed it has the effect of conveying the notion of impartiality.

Abroad, psychological methods are used to study the comparative national psychology with a view to predicting what the responses of whole nations are likely to be. Prominent individuals in other countries are studied and a dossier made of each of them so that their strength and weakness may be known and played upon accordingly. It is interesting to note that Churchill and Eden were regarded as extremely dangerous to German aspirations before the war. It is also worth while comparing the coldly scientific nature of these inquiries with the apparently unscientific appearance of the propaganda based on them; but, in fact, this very propaganda is itself scientifically compiled and its effect on the masses at home and abroad carefully calculated.

The essential principles of propaganda in the German view are that the emotions rather than the intellect must be appealed to; it must be simple, it must be repetitive, and it must have a reckless pugnacity.

Conclusion

The chief points that stand out as a result of this American Survey are the long preparations that have been made, their comprehensiveness, their basis in the desire for revenge, their essential continuity with the spirit behind them—a continuity of the spirit that prompted the "First German War"—their combination of academic science with the ablest common sense, and, most dangerous of all, the enlistment of ideal moral qualities in the services of purely nationalistic aims of aggrandisement. But that there are weaknesses somewhere in the organization and shortcomings in the results is indicated very clearly by the need for a special corps of intimidators, nearly half a million strong. This in itself seems to be a confession

that in spite of all the techniques employed it is impossible to suppress individual thought and to command completely the individual's participation in the aims of the leaders who conceived all this.

The American Committee for National Morale, of which Mr. Arthur Upham Pope is chairman and which has comprehensive subcommittees representing not only psychology and psychiatry but general medicine, education, journalism, social sciences, foreign affairs, economics, industrial relations, radio and civic agencies, has earned our gratitude in making this Survey. The scope of it can be judged by the extent of the bibliography, which comprises 561 titles, almost without exception from German literature.

R. D. GILLESPIE.

Reports of Societies

CROSS-INFECTION IN WARDS

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on February 27 the subject of discussion was "Cross-infection in Wards." Dr. E. H. R. HARRIES presided.

The Pathologist's Point of View

Dr. R. CRUICKSHANK said there was no doubt that to-day the streptococcus was the arch-enemy so far as cross-infection was concerned, but staphylococcal infections were becoming rather common in evacuated infant nurseries, gastro-enteritis was a common secondary infection among young children, and diphtheritic cross-infection, often symptomless, could be administratively a nuisance in diphtheria, scarlet fever, and measles wards. Dealing with respiratory infections, in which the air was the principal vehicle, he said that when a person with an acute infection sneezed he ejected a large number of droplets, most of which described a short trajectory to the ground within a limit of three or four feet, but a fair proportion of very minute droplets remained suspended in the air for short periods, and these droplet nuclei, as they were called, might be an important factor in "air-borne" infection. Droplets falling on a horizontal surface, often the bedspread, might contain pathogens which resisted drying and were raised again into the air as infected dust. With regard to the carrier, attempts to show that carriers could eject pathogens had usually failed, and it might be that too much had been made of the streptococcal throat carrier as a source for the spread of respiratory infections. The nurse who was a carrier might, from her intimate contact with the patient, spread infection to susceptible tissue, but the carrier-patient in bed, unless he came into contact with another patient, did not seem likely to be a potent source. In the case of intestinal infections, which were spread mostly by the infection of food, symptomless carriers were probably important links in the chain.

For the control of infection, adequate ventilation, bed spacing, and isolation accommodation were necessary, but the last was not always easy to provide. Screens might be used as an alternative to isolation accommodation, but it was important that they should reach to the floor and be of proper design. In the case of the attendant there should be a freer use of masks while attending children. Dust was a major problem in dealing with infections in streptococcal and diphtheritic wards. Much could be done by instruction of nursing staff in the newer ideas concerning spread of infection, by ward discipline, by scrupulous care in admission of patients, and by tackling the problem of dust, which in an infectious diseases hospital must be settled before the relative importance of other channels for the spread of infection could be ascertained.

Children's Hospitals

Dr. R. H. DOBBS said that the first approach to a solution of the problem was by means of satisfactory hospital architecture. There should be an admission ward with cubicles in which each child spent the first forty-eight hours, and ward units should consist of six to eight cots, with a number of cubicles in which infectious children should be nursed. Such an arrangement now existed at Great Ormond Street. Many hospitals, however, had to do their best with twenty or thirty beds in the ward and no admission unit. Here the provision of movable glass screens had been of great advantage. Bed spacing in infectious diseases hospitals should be 12 ft. between cot centres. In a children's ward this might be extravagant, and in fact 8 ft. or even less was often the best one could attain. At all events there should be one window to each cot.

Under nursing technique he included not only what nurses did but how doctors and visitors behaved. Strict isolation technique included the wearing of a gown when entering an infected area. Nurses who suffered from sore throats or colds should be suspended from duty. Masks must be worn and frequently changed, and in between the double layer of gauze they should have a thin layer of some impervious material. There must also be alertness on the part of the nursing staff to observe the earliest prodromal stages, and a standing order that children with pyrexia or rash be isolated even before calling in the house doctor to pass judgment on its nature. Non-immune children should be sandwiched among as many immune as were available. All medical and nursing staff should be swabbed and Schick-tested before taking up work in a children's hospital. The routine he had described, if carried out efficiently, would reduce the incidence of secondary cases to very small proportions and greatly minimize the danger to the children.

The Fever Hospital

Dr. N. D. BEGG said that the problem of ward infections in fever hospitals approximated to that encountered in a children's hospital, but with this difference—that one must also guard against secondary infection by different types of the primary infecting organism. The principle of structural separation had culminated in the construction at the North-Eastern Hospital of single- or double-bedded isolation units in the proportion of 40% of the total accommodation of the hospital. The most difficult problems were the enteral infections of unknown aetiology, which included infantile gastro-enteritis. In the general control of this most serious risk to infant life breast-feeding was the most important single preventive measure. Often the original condition for which the child was admitted to hospital was trivial and could well have been managed at home, but, what was quite unforgivable, it was regarded as a justification for stopping breast-feeding. A more realistic attitude to gastro-enteritis was certainly needed.

As to upper respiratory infections, the haemolytic streptococcus was widespread in its activity in a fever hospital. There was abundant evidence that cross-infection as indicated by change of infecting type was frequent in scarlet fever wards, but it would be a mistake to assume that all the late complications of scarlet fever must necessarily be the result of reinfection. In diphtheria the routine isolation of doubtful cases on admission, with subsequent bacteriological investigation, was a perfectly feasible proposition, although costly in accommodation. In measles a similar clinical supervision might be exercised to exclude gross septic cases, particularly those with rhinitis and otorrhoea. The convalescent ward, like the convalescent hospital, was not remarkable for its freedom from cross-infection, possibly owing to the fact that patients were selected for convalescence with rather more regard to their physical needs than to their particular infectivity. Carriers among the staff originated infection in wards from time to time. Full protection to staff against scarlet fever could be afforded by active immunization, but this did not preclude the possibility of streptococcal tonsillitis. Susceptibility in this respect was largely confined to new entrants, and there were obvious advantages in allocating such entrants to neutral wards—whooping-cough, for example—during the first few months of duty. Although the danger of staff carriers could not be ignored, they probably did not play an important part in streptococcal cross-infection in fever hospitals.

Hospital Infection in Wound Cases

Mr. W. MCKISSOCK said that there was a regrettable tendency to minimize the hospital infection of wounds. He gave a brief account of the cases of hospital infection with *Str. pyogenes* over a period of fifteen months in his own department in cases of clean operation wounds or wounds of the head of varying degrees of severity. Before the adoption of a special system of

ward precautions, nursing care, and dressing technique, the percentage of instances of hospital infection was 15.4. The corresponding figure for the first four months after the adoption of the special precautions was 1.1%. There had now been eleven months' experience of this regime, and the percentage over the whole of that period was 0.8; this related to a series of 251 cases, 197 of which were clean operation cases and 54 were wounds of the head. The reservoir of *Str. pyogenes* still existed in the wards during the period of control, and all other conditions were the same.

Barrier Nursing

The PRESIDENT (Dr. E. H. R. Harries) said that the most striking thing about the study of cross-infection was the enlargement of the original conception. At the time he started work in an infectious diseases ward the conception of cross-infection was the primitive one of transference to a non-immune of a clinically recognizable specific infection; but now the conception had widened and included not only manifest but latent infections, and this from the point of view of the bacteriologist, of course, was perfectly consistent. Some years ago S. F. Dudley worked out what the speaker thought was the clearest conception of the problems involved in the study of infections in closed or semi-closed communities. This was published by the Medical Research Council in their Green Book No. 111, 1926. The velocity with which host resistance acted in a positive or negative direction could be controlled to a very limited extent by passive immunization, but that was only valid in respect of three or four specific infections and was of short duration.

What he himself felt about many of these studies of cross-infection was that it was necessary to see that they did not go beyond the practical, that the technique was not so complex that the staff would be unable to see the wood for the trees, that the measures, instead of being prophylactic, did not become phylacteries. The simpler the technique the better. When their new isolation blocks were constructed at the North-Eastern Hospital they contained 112 separate single glass cells, and it was laid down that there were to be three coats hanging on separate pegs for each cell—one for the doctor, one for the nurse, and one for the domestic assistant. With a spare set of coats in the laundry and another in reserve, this meant one thousand cubicle coats. It was manifestly quite impossible for a medical officer on his morning round and for the nurse to go through the rigorous technique of barrier nursing twenty-eight times, and accordingly he decided to rationalize the whole thing. He divided the cases into highly infective, less infective, and non-infective groups, and retained the full technique only for the first of these, the cases being indicated on the cell door by a red disk. When these cases became less infective the disk was removed and the technique carried out without these barrier coats; and in the result there was certainly no increase in cross-infection. His experience of the results without these coats in certain categories of cases was quite satisfactory provided there was rigorous washing of hands. To elaborate the techniques too much was to invite them to be by-passed.

He believed previous histories of infectious diseases to be entirely unreliable, except in the case of chicken-pox or vaccinia, in which there were marks on the skin. A story of whooping-cough was perhaps reliable because the trouble had lasted for several weeks and impressed itself on the family.

In some further discussion Dr. PHILIP EVANS gave an account of some cases of epidemic diarrhoea occurring in a children's hospital. Dr. R. A. O'BRIEN asked whether it was possible to have an efficient mask which was not a nuisance to wear. Lieut.-Commander J. BUNYAN said that it was remarkable how little notice was taken of the effectiveness of sterilizing the air by spraying. Dr. V. D. ALLISON spoke of the need for instructing the nursing staff not merely in the ritual but in the rationale of the technique which they were supposed to carry out. Dr. NOBEL mentioned the arrangement carried out in a children's hospital in Vienna, where there were two rows of glass cubicles on either side of a central aisle. Each cubicle had a door opening on the side aisles, which were used only by the doctors and nurses, while the central aisle, from which there was no opening into the cubicles, was used by visitors. But even this arrangement did not suffice to prevent cross-infection of measles or chicken-pox.

Correspondence

Immunization against Diphtheria

SIR,—I have been greatly interested in the article on the subject of immunization against diphtheria with A.P.T., by Dr. G. S. Wilson and colleagues (March 7, p. 315). The writers are to be congratulated on the able way in which they have presented some of the facts, and one finds no evidence that hasty conclusions have been arrived at anywhere in the course of the work. This has been a great evil in the evolution stage of diphtheria prophylaxis. May I raise one or two small points in connexion with the article.

1. Is there any reason to suppose that the actual size of the affected area in a Schick test is a basis for comparison of the susceptibility to diphtheria of different subjects? Is not the intensity of the reaction the main thing that matters? Surely the size of the reading is largely a question of variation in the texture and permeability of the skin in different subjects. This contention is supported by the fact that in a partially immunized person the initial, intensely red Schick reaction becomes much paler at the second test without necessarily becoming smaller. I do not understand the purpose or value of the measurement classification adopted by the authors for statistical or comparative purposes. It may be convenient, but does it really mean anything? I always record the size of my positive Schick readings, but only for purposes of comparison in the same individual and not as a measure of plus value unless *both large and intense*.

2. Is it really expedient to lay so much emphasis on reactions to A.P.T. produced as a result of subcutaneous injections? The vast majority of reactions of sufficient obvious intensity to give cause for complaint are readily avoided by using the deep intramuscular route. Results from the latter method are perfectly satisfactory. In dosage of 0.2 and 0.5 c.cm. (employing Burroughs Wellcome A.P.T.) 472 children gave me a genuine conversion rate of 98.3% and complaints of reaction or disability were very infrequent. Are not the writers' figures for the subcutaneous route calculated to present an unduly pessimistic picture? The odd sterile abscess will, of course, occasionally be encountered, but I have only met about three since the introduction of A.P.T. But where lies the necessity for displaying the inevitable reactions through the shop window of the skin? It is agreed that naturally immune children, or those nearly so, do react more frequently and more severely to A.P.T. injections than Schick-positive children. That is surely an argument for not attempting to paint the lily.

3. This article might be of even greater value to the profession if the writers had seen fit to mention their various antigens by name. This ambiguity deprives many other workers of helpful guidance.

4. A careful study of Tables IV and V with special reference to antigens B1 and F is of interest. These have been shown to correspond so closely in Lf value and performance with two antigens on which I published some adverse reports a few months ago that I have no doubt that we were both talking of the same brands and probably batches. As these antigens were fairly freely used in some areas their positive identification is of no mean import to certain medical officers of health. My own results with Burroughs Wellcome A.P.T. in the Metropolis correspond fairly closely with those given in the article for antigen A, provided one excludes those schools which show 100% conversion rate. Outside London I do not obtain quite such good figures. A colleague reports similar findings to me.

I must add that Table IV provides me with a problem. If one adds up the figures of all the schools which show 100% success, one finds no fewer than 622 cases without a single re-Schick-positive reading. This is a magnificent result, but if it happened to me I am afraid that I should be seriously disturbed. I should know that something had gone wrong with my Schick testing, and that probably the indicating toxin in my Schick material had become mostly, if not completely, "toxoided." Such things do happen, and I have occasionally had to seek toxin which gave clearer readings for the purposes of accurate observation. Alternatively I should have felt that I must have lost my ancient cunning at performing intradermal injections,

or used control solution in mistake for toxin. It is true that my experience of the work is limited to some 140,000 primary and post Schick tests all personally performed, but these should suffice to provide sufficient experience of legitimate expectations. In the course of this work I do not think I have ever met a hundred consecutive cases done by any known method or with any available antigen which failed to provide its quota of re-Schick positives. It is generally recognized that there is a proportion of children who are more than usually resistant to immunization than the average. A few of these will crop up in every reasonable series. The complete and closed series of 144 cases at Kidlington and 106 at Amersham would have sufficed to terrify me by their entire absence of positives, even had I been working with an orthodox dosage and powerful antigen. In my experience these optimum results just do not seem to happen, and I despair of ever being able to equal them.

5. I have conducted thousands of cases most carefully for two-dose methods of A.P.T. administration, but it does not seem worth while to embark on a huge analysis to demonstrate a deviation of a few decimal points. Those I have given elsewhere and here are strictly representative of the bulk findings. The 472 cases I have mentioned above are, of course, a different series from those quoted in Table VIII.

6. Can the results in the lower part of Table VII really be considered as satisfactory? A relapse of nearly one case in ten after the short period of just over one year (especially in a group of children who had not been sorted out by primary testing) can hardly be accepted as ideal. The suggestion (based on experience of a different area) that only 5.8% of these children *might* have been immune before inoculation does not seem to enter into the realm of scientific argument. I have at present records of 68 cases immunized and subsequently Schick-negative three years ago, who, on recent re-test, showed only one faint positive to fully active toxin. They originally received 0.2 c.cm. and 0.5 c.cm. of fairly potent A.P.T. at 14 days' interval. Of course they were all initially Schick-positive. The injections were made intramuscularly. If my figures for original conversion rate and long-range Schick tests on children injected intramuscularly are accepted, whence comes the weight of opinion in favour of the drawn-out monthly interval and why? And as I have stated, the complaints of reaction from deep intramuscular injections into the deltoid are almost negligible. Because it works, in clinic routine I have adopted the 14-day interval apart from research, as many more parents complete the treatment if it can be condensed into a shorter space of time. I think no one will accuse me of optimism in my reports.

The observation that the Schick-positive rate is higher in female than male children as shown by the χ^2 test is certainly significant. Perchance this is due to the fact that little girls are on the whole cleaner than little boys, and so do not as readily absorb their peck of dirt. It is a fact that in London one can often make a fair guess at which is the naturally immune child by the amount of grime on its face, hands, and neck!

In spite of some friendly criticism, I would like to thank the authors for this carefully compiled article and deep research into the bibliography. Sometimes the latter is apt to be misleading, and I expect a little mouse could tell a lot of amusing stories if he could have slipped in and seen exactly why some of these reports are at variance. However, papers of this type presented at the present time are urgently needed and cannot fail to be of use.—I am, etc.,

London, S.E.5. GUY BOUSFIELD, M.D.

War Neuroses

SIR,—In his paper on war neuroses (Feb. 28 and March 7) Major J. A. Hadfield makes a valuable contribution to our knowledge of their aetiology. I am less impressed with the treatment he advocates—pentothal anaesthesia, free association, and hypno-analysis—as it was followed by the "cure" of only 15% and improvement of only 43% of cases, which hardly warrants his conclusion that the training of psychiatrists in these methods is perhaps the most important function of his "neuropathic hospital." I feel sure that at least equally good results would have followed the treatment of the same cases in general hospitals by medical officers who had received no special training. In the last war, using much simpler methods, Major W. Johnson sent 80% of his war neurosis patients back to the front line from a special casualty clearing station in France, and Col. Gordon Holmes reported that less than 10% relapsed.

I do not know on what authority Major Hadfield states that in the last war soldiers suffering from war neuroses were automatically boarded out. The figures already quoted show how far this was from being the case in France, and in my own experience in neurological sections at Oxford and Netley and later at the Seale Hayne Military Hospital for Functional Nervous Disorders with its 350 beds, a good many patients were sent back to full duty and a much larger number to duty at home, in spite of the fact that few reached us who had not already been in other hospitals for well over six months. The remainder with hardly an exception were fit enough on discharge from the Army to do useful work in civil life.—I am, etc.,

Oxford. ARTHUR HURST.

Argyria

SIR,—Among the annotations in your issue of March 7 there is an account of W. R. Hill's experiences of argyria, seen at the Mayo Clinic between 1915 and 1939. The majority of the 68 cases which he collected are said to have taken the salt "through the mouth, either to be swallowed as medicine either in the form of pills or capsules, or to be used in the form of drops, paint, or sprays in the treatment of the nose and throat." Whether an equal number of such cases could have been collected during a similar length of time at any large hospital in this country it is impossible to say. It seems from the context that in most of Hill's cases the discoloration of the skin was not general, for he draws particular attention to the fact that, microscopically, "the silver is deposited not only where the typical discoloration is visible but also elsewhere."

Some 40 or 50 years ago, when silver salts were given for long periods in many chronic nervous diseases, it was not uncommon to see the victims of argyria in its most severe form.

In such the extreme discoloration of the skin was universal, and the salt was deposited in the same form in many of the internal organs. Some years ago, at the South Yorks Mental Hospital, the opportunity occurred of making a necropsy on one of these cases. This was a man aged 48, an inmate for some years, suffering from melancholia. For eight or nine years before admission he had been taking silver nitrate pills for real or imagined syphilis. On admission he was suffering from argyria, with complete generalized pigmentation of the skin. At necropsy, death was found to be due to coronary occlusion. Pigmentation was widely distributed in many organs. It was seen on the endothelial lining of the dura mater, the peritoneum, and the aorta. Perhaps the most noticeable place was the choroid plexus. Here it caused a jet-black discoloration which was in striking contrast to the surrounding parts. A microscopical section of this is shown in the accompanying figure, where the black deposit is seen as a thick continuous layer along the whole of the surface.

Happily silver salts are no longer given over long periods in the treatment of epilepsy, chorea, tabes, etc., their reputation for which, according to Cushny, "dates from the Arabs, and is said to have originated from the astrological medicine of that period, which taught that nervous diseases were especially affected by the phases of the moon, which was associated with silver in their system (hence lunar caustic, lunacy)."

For the details of this case and for permission to use the microscopical section I am indebted to Dr. Thorpe, medical superintendent, South Yorks Mental Hospital.—I am, etc.,

Sheffield. ARTHUR J. HALL.

Family History in Tuberculosis

SIR,—Recent correspondence has taken place in your columns on various aspects of this subject and controversy has arisen again about conjugal tuberculosis. It is stated in the annotation on infection and reinfection (March 7, p. 332) "that a retrograde step would be taken if in the control of the rising incidence of tuberculosis in this war the factor of resistance were alone considered and that of contact neglected." You deplore "vaguely expressed statements that contact is harmless."

I entirely agree with your opinion. The ancient arguments about the relative importance of soil and seed will continue to flare up until it is more generally realized that on neither side is there a monopoly of truth. Both are important in the production of new cases of the disease. That the factor of contact is one we will neglect at our peril was emphasized by figures I collected between 1934 and 1936 when, with the help of the London tuberculosis officers, I was able to investigate the family history of approximately 7,000 new cases of tuberculosis. Details were published (Annual Report of the L.C.C., 1937, **3**, Part 1, p. 45) showing that approximately one-third of these exhibited previous contact of some kind. Particular attention was paid to the intimate family history of just over 3,000 new male and 2,000 new female patients whose sputum contained tubercle bacilli. The frequency with which contact with a previous case was noted diminished with increasing age. Thus, while 15% of all males with positive sputum showed previous important contact with the disease in the intimate family circle, the percentage ranged from 24% in the 21–25 year group down to 10% in those over 40 years of age. As age advanced there is a similar diminution in the importance of contact with a previous case in females also. Females, however, at all ages show a higher incidence of previous contact, ranging from over 30% in those under 15 years down to 17% in those over 40. This greater incidence of contact in females is interesting, and it was thought that the wider opportunities of exposure to infection in the female by reason of domestic and nursing duties might be an important factor.

Among those showing family contact the "infecting" (or first) case in the family was the parent in 28% in females as against 21% in males. This seems to indicate that a tuberculous parent is a greater danger to a daughter than to a son, and here again the reason may be the special position of women in the household in regard to nursing and domestic duties and the like, with all the consequent increased chances of infection. Dealing with brothers and sisters, it was shown that there was contact with a previous case in the same sex more frequently than in the opposite sex. This could be accounted for by daily association and proximity in sleeping, again pointing to infection. Details as to the exact relationship of the first case in the family and the clinical condition of this case cannot be gone into here, but it is worth while pointing out that approximately three-quarters of the "infecting" cases were either living cases of pulmonary tuberculosis with positive sputum or cases who had succumbed to pulmonary tuberculosis within the previous five years, and that the relationship was that of either parent, husband or wife, child, brother or sister.

Those interested in conjugal tuberculosis may like to know that of the 2,123 female and 3,010 male T.B. + new adult patients it is estimated that there were 881 and 1,445 respectively who were married, and that in 47 and 52 instances the other partner to the marriage was already suffering from tuberculosis or had died of the disease in the previous five years; in the majority of these previous cases tubercle bacilli were present in the sputum. Thus, in 5.3% of married female consumptives and in 3.6% of married male consumptives the other partner to the marriage was already affected by the disease. The ordinary chance of this being the case is far less. Based upon the numbers on the metropolitan borough tuberculosis dispensary registers, and including an allowance for marital status and for five years' deaths from tuberculosis, it is estimated that 1.43% of husbands and 0.71% of wives might be expected to be tuberculous. I submit that these figures indicate a real risk of tuberculosis occurring between husband and wife. The reason may be to some extent economic, as doubtless great strain is laid on a family where either parent is consumptive, but it would be foolhardy to neglect the considerable likelihood of infection.

It should be realized also that the extent of conjugal tuberculosis noted above must be considered a minimal estimate, as, followed forward over a period of years, further cases would be likely to occur. In other words, following forward a number of consumptive husbands or wives, it is probable that a higher percentage of partners would eventually contract the disease than is suggested by the above figures.

As mentioned at the beginning of this letter, soil and seed are both important, but, whatever their relative degree of importance, these 7,000 family histories do show that contact with a previously diagnosed case of tuberculosis in the family is of sufficiently common occurrence to stimulate examination of contacts in any scheme of case-finding and that every effort should be made to examine and supervise over a considerable period of time contacts—especially, having regard to the frequency of the disease, young adult contacts—of living positive sputum cases or of those recently dead from the disease.—I am, etc.,

London, S.E.1. F. J. BENTLEY.

Origin of Tuberculosis in Adults

SIR,—Some extracts from a paper which I wrote over twenty years ago may be of interest in the present controversy. In that paper I endeavoured to assess the relative importance of infection and family history in an isolated country parish, where house infection was preponderant and "foreign contact" could be almost entirely eliminated.

The paper covered the incidence of tuberculosis during the period 1875 to 1914, and some of the conclusions arrived at are summarized as follows: (1) 17.5% of the total death rate was due to tuberculosis. (2) Such deaths occurred in rather less than one-third of the inhabited houses. (3) Of the deaths from tuberculosis, 45% occurred in 9% of the inhabited houses. (4) Of the total deaths from tuberculosis, 24% occurred in three families and their immediate collaterals. (5) In houses where only one death had occurred from this disease, less than one-fifth were inhabited by persons with a family history of tuberculosis. Where more than one death had occurred, more than a half were occupied by people with a family history of tuberculosis.

This merely shows the importance of infected environment, but throws no light on the latency of infection or the incidence of disease at an adult age. It may be of interest, therefore, to give a cross-section of the history of one family in the 40 years under review; your space would forbid a more complete picture.

Investigation of parish records showed that one man, "W. D.," died of consumption in 1859. He had five sons, none of whom was certified as having died of tuberculosis. One son, A, married a woman with a collateral history of tuberculosis and had nine children, six of whom died of pulmonary tuberculosis. Two others died in infancy, and one was said to be healthy at the time of the investigation in 1913-14. These deaths covered the period from 1879 to 1909; their ages ranged from 30 to 53 years. Four of them lived in separate houses. In five of the six cases the deaths were the first of certified pulmonary tuberculosis to occur in the houses concerned. The interval between the deaths of the two living in the same house was over thirty years.

Of these six, five were married. One, B, died in 1904, and her two daughters were seen by me in 1913; both had pulmonary tuberculosis and both insisted on sleeping together, and there is no doubt that one infected the other. C, a male, died in 1907; his wife had haemoptysis in 1914; she was his first cousin and the child of a tuberculous mother. They had two

children, one of whom died of tuberculous meningitis in 1904. D, a female, died in 1879, certified as "consumption"; she married her first cousin, who was seen by me with senile dementia and pulmonary tuberculosis in 1914. They had four children, one of whom married C and is referred to above as having had haemoptysis in 1914, and two who died of pulmonary tuberculosis in 1896 and 1902. E, a male, died of pulmonary tuberculosis in 1908. He married a woman with a family history of tuberculosis; they had seven children. One died in 1913 of pulmonary tuberculosis, aged 32. In 1914, when I was investigating this family, one female, aged 24, had advanced pulmonary tuberculosis; one male, aged 27, had advanced pulmonary tuberculosis; one male, aged about 16, was recovering from pleurisy with effusion; one male, age not stated, had quite definite signs of pulmonary tuberculosis; one female refused examination; and one brother was said to be healthy, but his wife had died from tuberculosis.

It will be seen that both delayed onset of disease and immediate infection from adult to adult can be demonstrated in this tragic tale of mortality.—I am, etc.,

Worthing. R. C. HUTCHINSON.

How Much Vitamin D?

SIR,—I was pleased to read the letter of Dr. Cécile Asher (March 7) because, since the inception of the scheme for the distribution of vitamin preparations, I have been interested in and also made anxious by the dosage of cod-liver oil compound recommended for infants below the age of 1 year. As Dr. Asher has pointed out, this dosage supplies for all infants below the age of 6 months a daily intake of 10 to 30 drops, which is equivalent to approximately 70 to 200 international units, and for infants above 6 months of age 30 to 60 drops, or approximately 200 to 400 international units. After 1 year the recommended dosage equivalent to 400 international units daily would appear to be a sufficient minimum prophylactic dose. But for children below that age, and especially for those below 6 months, there is no doubt that the dosage would be regarded as inadequate by most paediatricians.

It is also worthy of mention that no provision seems to have been made for variation of the dosage for artificially fed infants—premature infants, or twins, or infants suffering or recovering from infections—and no attempt is made in the instructions printed on the label of the bottle to encourage the parent to seek medical advice in regulating the dosage. This is an important point, because in Newcastle-upon-Tyne, where 70% of children under the age of 2 years have been registered for the vitamin preparations, active rickets in children of this age group had by 1939 become an uncommon condition, and the authority is anxious that it should not increase as a result of wartime conditions, when difficulties of shopping, of keeping the home together, and the National Milk Scheme, all acting in concert, have brought about a substantial decrease in the attendances at infant welfare centres.

May I therefore support Dr. Asher's request that the unit dosage, at least for children under the age of 1, should be doubled, and also ask that the instructions given should be revised (*a*) to indicate clearly for the information of doctors using the cod-liver oil compound the number of international units per drachm, and not "per gramme," as at present printed; and (*b*) to inform mothers that the dosage recommended is for average healthy babies, and that in the case of premature infants, twins, or during or after illness of infants, medical advice concerning the dose should be obtained.—I am, etc.,

Newcastle-upon-Tyne. F. J. W. MILLER, M.B., M.R.C.P.

Tampons in Menstruation

SIR,—During recent months I have had many inquiries from young patients or their mothers concerning the sanitary tampons which can now be obtained. While agreeing with advertisers that this product is, for a married woman, an advance over more old-fashioned ones, the frequent inquiries prompt me to protest against the indiscriminate sale of such goods to young unmarried girls. I could name an increasing number of girls not far past the age of puberty who, having been unable to procure any other variety of sanitary protection, have bought and attempted to use tampons. Some of these young women, after suffering some pain in their efforts, have failed to insert the tampon, and have sought the advice of an older woman. Others, having succeeded with difficulty in the insertion, have found it extremely painful or well-nigh impossible to remove the tampon some hours later. In view of the sensitiveness of many youngsters on this subject, I cannot help feeling that for every case which comes to the knowledge of doctor or nurse there must be many others in the same trouble and embarrassment who seek advice from no one.

It is obvious that the use of a tampon may result in rupture of the hymen; and whether or not we consider that this *per se* is to be deplored, I cannot believe that the use of such articles by young virgins can be anything but psychologically bad. Is it not advisable that at least some warning should be printed on the outside of the packings to the effect that the contents may not be satisfactory for unmarried women?—I am, etc.,

Oxford. M. S. BRANDER.

Strangulated Hernia

SIR,—I feel sure that the excellent article by Major D. M. Douglas on strangulated hernia (March 14, p. 354) will be widely read and appreciated. The mortality rate of strangulated hernia is distressingly high, particularly when one knows that it is an emergency which, in the majority of cases, is essentially preventable by insisting on radical cure before the occurrence of strangulation. Much could be done by practitioners and public health authorities to educate the public in this matter. The death rate for appendicectomy in acute cases has been reduced to 2% to 3% in the hands of capable surgeons, and surely this is in no small measure due to education of the public in the significance of abdominal pain. Yet strangulated hernia, an essentially preventable emergency, has not been given the attention it merits by those in a position to educate the public in its dangers and prevention.

Major Douglas's outline of the management of the condition in an aged patient is most interesting. The use of local anaesthesia as advocated is ideal, and is the method I prefer personally in the majority of cases. The technique of infiltration is easily learned, gentleness in operative technique is assured, enterectomy can be carried out without difficulty, and the "anaesthetic risks," immediate and remote, are *nil*. The mental confusion produced in some patients by morphine or omnopon is certainly disturbing; perhaps rectal paraldehyde would prove a satisfactory form of premedication for the apprehensive patient. I have not had the opportunity to employ it for such a case, but have found it most satisfactory before induction of spinal anaesthesia for hysterectomy in a nervous patient.

The advice to get the patient up early, backed as it is by sound reasoning, seems excellent and worthy of wider trial.

It would be interesting to know if local application of sulphanilamide powder to the anastomosis was employed in any of the cases submitted to resection, particularly as the mortality of resection in Major Douglas's series is only 28%, compared with the figure of 50% given by most textbooks. I have employed this measure in 4 resections (2 strangulated hernia, 1 regional ileitis, and 1 carcinoma of the colon), and have been impressed by the smoothness of convalescence in all cases.—I am, etc.,

Llandrindod Wells. LEWIS G. CRUICKSHANK, F.R.C.S.Ed.

SIR,—Some months ago I reviewed for my own interest a personal series of 66 consecutive operations for strangulated external hernia with reference to mortality. The results may be of some interest as showing several points of close resemblance to the series analysed by Major D. M. Douglas (March 14, p. 354) and one rather striking difference.

There were 21 inguinal cases with 1 death, 31 femoral with 3 deaths, 5 ventral with 1 death, 8 umbilical with 7 deaths, and 1 fatal case of obturator hernia—a total mortality of 20%. The malignancy of umbilical strangulation is shown. Femoral strangulation was twice as lethal as inguinal, though the actual death rate was raised by the exclusion from the series of a considerable number of successful reductions by taxis.

Exactly half of the patients were aged 55 or more. It is noteworthy that, with the exception of a woman of 40 who died from chronic ileal obstruction 4 months after operation, the patients in all the fatal cases were aged 55 or more, and 9 of these died within 24 hours of operation, the bowel in at least 4 being clearly in a recoverable condition. Of those

surviving longer 1 died of gangrene of the bowel, 1 of wound infection, and 1 gradually sank and died in 5 days. Resection was done in 5 cases, in two of which the patients died. Pulmonary complications appeared to play little or no part in the fatal cases and were not prominent in the survivors. Bronchitis was noted in only 8 cases, severe in 3.

During the same period, in a personal series of 16 cases of acute intestinal obstruction by peritoneal bands and adhesions, 3 patients died within 24 hours with viable bowel, 1 after resection steadily sank and died in 2½ days, 1 succumbed in 5 days in paralytic ileus, and 11 recovered without pulmonary complications. I conclude that in my cases post-operative shock and early circulatory collapse were the prominent cause of death, and that in external strangulation the determining factor was age. From, say, 50 or 55 early circulatory failure should be anticipated, and measures of resuscitation instituted as routine.—I am, etc.,

Newquay. S. W. DRINKWATER, F.R.C.S.

Treatment of Fractured Ribs

SIR,—In the article on treatment of fractured ribs (March 21, p. 383) Dr. Denys J. Neal Smith, in justification of the treatment advocated, discusses the mechanism of pain in fractured ribs. Perhaps the experience of an actual sufferer may be of interest. Early last year I sustained a severe blow on the right lower ribs. When I recovered my wind my first reaction was to take a long breath to see if anything had given way, but everything seemed all right. I was left with a dull, aching pain at the seat of the blow. This pain was very little aggravated by cough or deep breathing. Thirty-six hours later I happened to stoop, and the scene changed. There was the characteristic snap, feeling of grating, and the usual acute pain on deep breathing and on movement. *X*-ray examination next day showed a fracture of the tenth rib. Though cracked before, it is evident that the movement of the broken ends or interference with the intercostal nerve was necessary to cause the usual acute pain. The excursion of the broken ends was considerable, probably due to lack of support in this lower rib. Movement continued for 17 or 18 days before ceasing, and in the last few days was painless. Strapping, though affording comfort and a sense of confidence, was of little use in preventing the pain on coughing or on movement. A striking symptom at stool occurred during the first few days. Probably due to the fixation of the diaphragm causing a pull on its attachment close to the rib, and to the tightening of the abdominal muscles, a most painful spasm of the diaphragm and of the muscles of the abdomen and lower part of the chest on the affected side was produced. This was comparable to the pain of acute lumbago and completely immobilized me for a minute or two. This seems to afford corroboration of the theory that the acute pain in fracture of the ribs is due to painful spasm of the muscles, and in so far seems to justify the breaking of the reflex arc by the injection of procaine at the seat of the fracture.—I am, etc.,

Kirriemuir. ROBT. D. CAMPBELL.

Spinal Anaesthesia

SIR,—I have read with interest the recent correspondence on spinal anaesthesia, and note with satisfaction the increasing popularity of percaine whether used as a light or a heavy solution. There is one point in the letter from Mr. W. Etherington-Wilson (Feb. 21, p. 275) which I feel calls for comment. In the penultimate paragraph of his letter he gives the figures 1003 to 1004 as the specific gravity of cerebrospinal fluid from his own observations on 100 cases, and suggests that the figure 1007 may be an error which has been copied from book to book. That this is not so may be seen from the following table, which I have copied from Levinson's book on the cerebrospinal fluid. Levinson gives a list of thirteen observers, including himself, with their figures for the specific gravity of the cerebrospinal fluid.

Hoppe	1.001 to 1.005 (hydrocephalus)	Nawratzki	1.0073 to 1.008 (same for horse)
Halliburton	1.007 to 1.008	Pende	1.007 to 1.010
Kafka	1.002 to 1.008	Borelli and Data	1.007 to 1.009
Zdarek	1.007	Williamson	1.005 to 1.009
Polányi	1.005 to 1.007	Hammersten	1.007 to 1.008
Mestrezat	1.00759 (20° C.)	Eskuchen	1.006 to 1.007
		Levinson	1.0034 to 1.0070

It will thus be seen that the figure 1007 represents an average and may be taken as reasonably accurate. I will venture to suggest that Mr. Etherington-Wilson would have found the specific gravity of the cerebrospinal fluid in his own series of cases nearer 1007 if he had measured it at room temperature instead of at body heat. The figure of 1000, which is used for purposes of comparison, is that given to the specific gravity of distilled water at 15° C. For each rise in temperature of 5° C. there is an alteration of one part in a thousand in the specific gravity of water, so that at body heat it should be round about 996. Mr. Etherington-Wilson's figures are, therefore, relative to this latter figure rather than to 1000.

I note too that Mr. Etherington-Wilson did not find any rise in the specific gravity of cerebrospinal fluid taken from patients with high blood urea. This seems surprising, as in uraemic conditions the cerebrospinal fluid contains nearly as much urea as the blood in addition to other substances such as chlorides, and one would naturally expect to find a rise in its specific gravity. I have actually seen it stated that in uraemia the specific gravity may be as high as 1016, but unfortunately I cannot remember the source of this reference. Information on this subject is extremely hard to find, as very few books do more than mention that, under normal conditions, the specific gravity of the cerebrospinal fluid is about 1007. Nor do they mention the fact that the specific gravity of fluid taken by cisternal puncture is less than that taken by lumbar puncture. This is due to the fact that the lumbar fluid contains slightly less sugar but considerably more cells and protein than the cisternal fluid. We could do with a little more information on this subject, though it is probably of no great practical value to anyone but the anaesthetist who uses light percaine.

Heavy percaine has a specific gravity of 1020, and slight individual variations in the specific gravity of the cerebrospinal fluid of a patient do not matter as the percaine solution will always be definitely heavier. I have used the heavy solution in several thousand cases ever since it was put on the market in this country, and have been very pleased with the results obtained. I have given up using the light solution except for operations on the chest or kidney, when a unilateral anaesthesia is required. Light percaine does very occasionally produce phrenic paralysis, as a perusal of the correspondence in the *British Journal of Anaesthesia* (1939) will show. So far as I know there have been no cases of phrenic paralysis reported with heavy percaine, and I always feel that I have more control over it than over the light solution. It is probably a good thing for anaesthesia that both solutions have their supporters.—I am, etc.,

Staines. J. K. HASLER.

Aetiology of Disseminated Sclerosis

SIR,—I have read Dr. Eileen M. Hickey's stimulating letter (February 14, p. 239) with great interest. The evidence seems, as suggested, to point to some vascular agent producing demyelinization. Coagulation of the blood—i.e., thrombosis—as an early factor has been put forward but not confirmed. Hassin (*Arch. Neurol. Psychiat.*, 1937, **38**, 713) maintains that thrombosis does not occur in uncomplicated cases but may occur due to septic or terminal changes. Dawson (*Trans. roy. Soc. Edinb.*, 1916, **1**, 517), in his admirable work on the pathology of the disease, observed aggregations of white cells and also fibrin, but found no organized thrombi.

There also seems evidence that endogenous susceptibility may play a part. In a series of cases which I investigated a large number gave a history of other nervous diseases in the family. Familial cases are, however, rare. I have encountered only one such instance of a brother and sister both typical cases of disseminated sclerosis. In a second instance disseminated sclerosis was originally diagnosed in the case of two sisters; one was, in fact, a typical case of this disease whereas the other turned out to be a case of myasthenia gravis. In a third instance, again of two sisters, one was a typical case of disseminated sclerosis, while the other, who was also at first thought to be suffering from this disease, would now appear, in all probability, to be suffering from a purely functional condition.

As regards allergy, the sharp onset of the ocular symptoms in most cases and of the motor symptoms in a number of cases, and the recurrence of attacks, suggest allergic phenomena occur-

ring in focally sensitized areas of the central nervous system. Baer and Salzberger (*Arch. Neurol. Psychiat.*, 1939, **42**, 837) find that the percentage of cases of disseminated sclerosis sensitive to skin tests or presenting evidence of personal or familial atopic disease is in the higher limits of the normal. Dr. F. A. Pickworth has suggested that a streptococcal infection in early life might cause chronic focal lesions in the central nervous system, and that a similar subsequent infection results in focal allergic reactions in these sensitized areas. Dr. Pickworth has carried out for me an investigation of the haemolytic properties of blood samples from fifty cases of disseminated sclerosis, to find whether there was any increase in the haemolytic content, indicating a toxin liberated as the result of some infection. It is suggested that the haemolytic and myelolytic properties of the blood in certain phases of the disease might very well prove to be related, as the chemical composition of the myelin sheath and envelope of the red cell is similar. The results obtained have not yet been fully analysed.

There is not sufficient evidence that we are dealing with a deficiency disease, although vitamin treatments have been tried with varying success.

As regards the absence of free acid in the gastric secretion, Pepper and Wilson (*Amer. J. med. Sci.*, 1933, **186**, 773) had such a case, but fractional test meals in eleven others showed free acid in all. In the cases I investigated no achlorhydria occurred. I had one case, however, previously diagnosed as of disseminated sclerosis, in which free acid was absent; this turned out to be a case of subacute combined degeneration. On the other hand, Mr. Garfield Thomas of the Birmingham United Hospital, who has done test meals in a large number of cases, including cases of disseminated sclerosis, finds that it is no infrequent occurrence to encounter an absence of free HCl after a test meal carried out in the ordinary way and subsequently to find free HCl in the fasting juice of the same patient, even when no histamine has been given. He considers it essential that before a patient can be considered truly achlorhydric no free acid should be discovered in response to a histamine test.—I am, etc.,

Birmingham. S. SILVERMAN.

The Foot of Man and Apes

SIR,—My attention has been called to an article on the human foot by Mr. Norman Lake (Jan. 10, p. 31). I am only concerned with the misleading diagram purporting to represent the evolution of the highly specialized, not "debased," human foot from that of the lower primates. In connexion with this diagram it may be pointed out that no macaque has a foot like Fig. 4 (1) and no gibbon a foot like Fig. 4 (2). Conceivably the figures have been transposed; also that Figs. 4 (3) and (4) suggest a difference between the foot of the gorilla and of the chimpanzee which does not exist. The truth of these criticisms can be verified by reference to a paper of mine in the *Proceedings of the Zoological Society* for 1926, containing drawings of the feet of the species in question taken from carefully measured fresh specimens.

Those mistakes, however, are of minor importance compared with the error contained in Fig. 4 (5). This is said to represent the sole of the foot of the "highland" gorilla and professes to show its striking difference from the foot of the "lowland" gorilla and its close approach to the human type in the fusion of the metatarsus of the hallux with the rest of the foot, so that only the two phalanges are freely movable. Since the two species of gorilla have similar feet, with a large prehensile hallux, the tip of which is opposable to the tips of the remaining toes, the figure is most misleading. Its source is well known. It was copied from a photograph taken by the American traveller Akeley, who shot a "highland" gorilla and photographed its foot, or a cast of it, with the great toe turned forwards and the light falling in such a direction that the sole looks flat owing to the obliteration of the shadow of the deep crease resulting from the position of the toe, thus giving the fictitious appearance of complete fusion of the metatarsal area of that digit with the rest of the foot. Akeley may have been innocent of any intention to deceive, but he made no reply when the accuracy of his photograph was challenged over here. He succeeded, however, in completely deluding his compatriot, Prof. W. K. Gregory, a distinguished palaeontologist, whom Mr. Lake cites as one of the authorities on the anthropoid foot. Gregory gave zoological publicity to Akeley's photograph as supplying evidence of intergradation between the gorilla's foot and the widely different foot of man. No such intergradation exists; and the deception was exposed in *Nature* at the time by the late Sir Ray Lankester and by myself on his invitation.

In conclusion I should like to add that no one will blame Mr. Lake for not knowing what the feet of apes and monkeys are really like or for trusting the sources of information about them to which he had access.—I am, etc.,

British Museum (Natural History). R. I. POCOCK.

What is a "Truby King" Baby?

SIR,—What is a "Truby King" baby? If I were asked to answer this I should say there were three types: (1) the healthy breast-fed baby; (2) the pale, underweight, "dilute"-looking artificially fed baby; and (3) the "negativistic" toddler.

The Truby King practice of breast-feeding leaves nothing to be desired—though Truby King has no monopoly in this—but his method of artificial feeding, as you rightly point out, leads to a reduction not only of protein but also of vitamins and salts, especially iron. In order to rectify this, special additions have to be made, leaving the mother a complicated technique to follow. This in turn leads to a maternal dietetic anxiety which later reveals itself as negativism.

The Truby King clinics, however, do fill a want for the middle-class parent who is unwilling to attend the public health welfare centre or to afford doctor's fees for frequent visits for advice on infant feeding and management. The remedy is, however, in the practitioners' hands, who are often only too glad to pass these mothers on to such clinics. It is in such work as this that the best opportunity lies for doctors to practise preventive medicine, and we as a profession ought not to let this important work pass from our hands.—I am, etc.,

Cardiff. A. G. WATKINS.

The Teaching of Anatomy

SIR,—I am writing to answer the late Sir Henry Brackenbury, who asked (March 14, p. 368), Why do anatomists think that the student should dissect the whole body as at present? When this point was raised some years ago I asked my classes whether they would like to dissect only part of the body, and to learn the rest from demonstrations and by observations of dissected specimens. Then they were unanimously against the suggestion. I have now again asked members of my class to answer this query, and to support their reply with a reasoned statement.

The present-day student prefers to dissect the whole body for the following reasons:

(1) In dissecting, a student learns to use his own initiative, and it is only after some practice of this art that initiative can have useful results. Thus dissection should continue throughout the Second M.B. course. (2) Dissection, as well as training the hand in the use of knife and forceps, teaches the student to use and develop his powers of observation and his sense of touch. (3) When carrying out a complete dissection the student literally "unpicks" in an ordered manner the part of the body being studied. There would be loss of continuity if this ordered dissection were replaced by the acquisition of knowledge from already dissected specimens. (4) The dissector looks for and displays the relations of the various structures, and this search allied with manual work aids both his understanding and his memory. A structure previously dissected by a prosector, even though demonstrated as important, would not impress itself as deeply on the memory as if the student had sought for and displayed it himself. (5) The long periods spent looking at the various regions of the "part" while dissecting it help to impress a mental picture and thus to develop a visual memory. (6) The psychological effect is important. Actual dissection gives the student a more personal interest in anatomy than he would otherwise have.

I do not think I can usefully enlarge on these points made by my students, which I fully approve.—I am, etc.,

MARY F. LUCAS KEENE.

SIR,—Prof. F. Wood Jones (March 14, p. 368) charges me with a paradox where my words were intended as intelligent discrimination between unprofitable and practical knowledge. His sally does not invalidate my main criticism and that of other correspondents. A vast amount of the anatomical lore required

of medical students is of little value to the average doctor and is an abuse of the students' time.

The Royal Colleges and Universities should appoint a revisory committee of professors of anatomy and interested clinicians. They would easily arrive at unanimity regarding the elimination of half the contents in the textbooks of anatomy. Surely that amount of reform represents an advance that is well worth while and is early needed. The ultimate goal will never be reached if we are daunted at the outset by lack of a smooth straight path all the way to it.—I am, etc.,

Bristol. A. WILFRID ADAMS.

Arsenical Thrombocytopenic Purpura

SIR,—In the article on the above subject by Major S. M. Laird (March 21, p. 381) reference is made to our paper on capillary fragility (*Lancet*, 1940, **2**, 155). We are reported as indicating that "vitamin P is more concerned than ascorbic acid in maintaining normal capillary resistance." Actually our work on the capillary fragility of normal students showed that the majority of cases with an increase of capillary fragility responded to the oral administration of vitamin C, and that those cases which did not respond to this treatment were entirely uninfluenced by the administration of vitamin P.—We are, etc.,

G. H. BELL.
S. LAZARUS.
The University, Glasgow. H. N. MUNRO.

A Doctor's Dilemma

SIR,—With reference to your medico-legal note under the heading "A Doctor's Dilemma" (March 7, p. 343) may I record a parallel incident which might have resulted in much difficulty and distress.

I was called a year or two ago to attend an elderly man who was dying of cancer. His wife and daughters begged me not to tell him what was the matter and to hide from him that he was in imminent danger of dissolution. Very much against my judgment I concurred. So solicitous were they for his peace of mind that they also kept him in ignorance that some valuable property he owned in London had been entirely demolished by a bomb. They even went so far as to hope that he might pass peacefully away before quarter day, since he would quickly tumble to what had happened when his rents failed to come in. Luckily for everybody this event did not occur and he got to know about his loss while he was still perfectly clear in his mind. He sent for his will and altered it. Within a week he was dead. He had been a man of considerable wealth, and had left, in the original will, the valuable property to his wife and *all the rest of his possessions to a charity*.

I think it is almost always wrong to withhold from a dying patient the fact that he will not recover—opportunity nearly always occurs for the news to be gently broken to the patient.—I am, etc.,

Watlington, Oxford. T. L. CRAWHALL.

Certificates of Fitness for Removal to Hospital

SIR,—For some considerable time past at each monthly meeting of the Joint Hospital Board the medical officer has submitted a report concerning the admission of cases of infectious disease, and the Board have been very much concerned to note the number of cases of patients dying within two or three days, in some cases within a few hours only of their admission to the hospital. This has occurred particularly among young children ranging from a few months to the age of about 10 years.

The matter has been taken up with the county medical officer of health, the regional medical officer of the Ministry of Health, and the medical officers of health of the constituent authorities. Representations were made to the Ministry calling attention to the matter and expressing the view that one of the main causes of the events referred to was delay in calling in the services of a medical practitioner, and it was thought that advice to parents should receive nation-wide publicity. It was accordingly suggested to the Ministry that this publicity should be given by means of a broadcast announcement, and the Board understands that such an announcement has, in fact, already been made.

Apart from this broadcast the Board felt that there should be some means by which the matter could be brought to the notice of all medical practitioners, and in the hope that the medium of the medical press might be used with this object in view I was instructed to bring the circumstances to your notice.—I am, etc.,

J. J. R. DAY,
Clerk of the South-East Essex Joint Hospital Board.
Brentwood.

The Services

Temp. Surg. Lieut. John Dennys Kidd, R.N.V.R., has been mentioned in dispatches.

CASUALTIES IN THE MEDICAL SERVICES

Surg. Lieut. SIDNEY LEWIS BINDERMAN, R.N.V.R., is reported "Missing, Presumed Killed" in H.M.S. *Vortigern*, which was sunk on March 15, and which he joined only a few days earlier. He was born on July 2, 1915, the son of Dr. and Mrs. Binderman of Brooklyn, New York, and graduated M.B., B.Chir. of the University of Cambridge last year. After working as casualty officer at Addenbrooke's Hospital, Cambridge, he entered the R.N.V.R.

Missing.—Capt. A. H. R. Coombes, R.A.M.C.; Surg. Lieut. J. D. James, R.N.V.R.; Surg. Lieut. D. R. Syred, R.N.V.R.

DEATHS IN THE SERVICES

Surgeon Rear-Admiral Sir WILLIAM WENMOTH PRYN, K.B.E., C.B., R.N. (ret.), has died at Stoke Gabriel, Devonshire. He was born at Saltash on October 21, 1859, the son of W. Pryn, and was educated at Blundell's School, Tiverton, and at Guy's Hospital, where he took the gold medal for surgery in 1880. He qualified M.R.C.S. and L.S.A. in the same year, and took the D.P.H. in 1895. After filling the posts of house-surgeon and resident obstetrical officer at Guy's Hospital and assistant surgeon at the Royal Albert Hospital, Devonport, he entered the Royal Navy as surgeon in 1886, became staff surgeon in 1898, fleet surgeon in 1902, deputy surgeon general (now surgeon captain) in 1911, surgeon general (now surgeon rear-admiral) in 1916, and retired under the age limit in 1919. During his thirty-four years of service he had been a surgeon in H.M.S. *Orlando* in the Australian Station; staff surgeon in H.M.S. *Minerva* in the Training Squadron; medical officer at the R.N. College, Greenwich; assistant to the Medical Director-General, R.N., from 1906 to 1910; in charge of the naval hospital at Gibraltar from 1912 to 1916; and surgeon general in charge of the Royal Naval Hospital, Plymouth. He received the C.B. in 1918 and the K.B.E. in 1919. In 1891 he married Isabella Kate, daughter of Major J. Cotter of The Buffs, and had two sons, the elder of whom entered the R.A.M.C., and two daughters, both of whom married naval medical officers. He had been a member of the British Medical Association for fifty-six years.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The Linacre Lecture on "The Onset of Respiration at Birth" will be delivered by Sir Joseph Barcroft, F.R.S., emeritus professor of physiology, in St. John's College, on Wednesday, May 6, at 5 p.m.

UNIVERSITY OF LONDON

A week-end course for medical practitioners on factory medical services and industrial diseases (fee, £1 1s.) will be held at the London School of Hygiene and Tropical Medicine (Keppel Street, Gower Street, W.C.) on Saturday and Sunday, April 18 and 19. On April 18, at 2 p.m., Dr. R. E. Lane will discuss "The Nature and Prevention of Toxic Risks," and at 3.30 p.m. Dr. M. W. Goldblatt will speak on "The Nature, Prevention, and Treatment of Occupational Skin Diseases." The following is the programme for April 19: 10.30 a.m., Dr. D. Stewart, "Factory Hygiene: Assessment of Standards and Methods of Investigation"; 12 noon, Mr. P. McG. Moffat, "Ophthalmology in Relation to Industrial Medicine"; 2 p.m., Dr. Joan E. Harwood, "Women in Industry: The Practical Problems arising and the Factors influencing Doctors' Views and Decisions"; 3.15 p.m., Mr. R. E. Tugman, "Protective Clothing and Appliances."

UNIVERSITY OF SHEFFIELD

The following candidates have been approved at the examination indicated:

FINAL M.B., CH.B.—*Parts II and III*: •A. Stanworth, •†‡H. B. Stoner, E. A. Broomhead, T. E. Cleghorn, Mary Darlow, J. F. B. Edeson, H. Kelsey, †H. I. Le Brun, Gwenol Nicholson, J. H. Schofield, H. J. Towle.
•With first-class honours. †With distinction in medicine. ‡With distinction in therapeutics.

Obituary

G. S. A. WAYLEN, M.R.C.S.

Dr. George Swithin Adée Waylen of Devizes died on March 14 in his 91st year. He was a remarkable example of the country-town practitioner of a bygone age. A man of great kindness and with a shrewd sense of humour, he yet bore himself always with a dignity worthy of the position his forebears and he himself had attained in the ancient borough.

Swithin Waylen came of a long line of medical men. He studied medicine at St. Bartholomew's Hospital and qualified as M.R.C.S. in 1873, after which he held house appointments there, and then returned to join the family practice at Devizes, in which there have been five direct successions of Waylens. He at once entered into the medical work at the cottage hospital and remained a member of the active staff until 1920. He was largely instrumental in getting the local isolation hospital built, became its first medical officer, and his interest in it lasted to the end; he was proud of the fact that he was one of the first to adopt the use of serum for diphtheria. He served as medical officer to the Devizes Urban District Council for 34 years and to the Rural District Council for 55 years, and on retirement was publicly presented with an illuminated scroll recording appreciation of his valuable services. Appointed borough coroner in 1876 Dr. Waylen held that office until 1938, when he was 87 years of age; he also served his town as a member of its council, and in 1897 was elected mayor, thus following the example of his father and his great-grandfather, and this tradition of mayoral service was continued by his son, Dr. George H. H. Waylen, who occupied the chair in 1932 and has succeeded him in many of his public appointments.

Dr. Swithin Waylen reached high rank in Freemasonry, was a justice of the peace, a churchwarden for 30 years, and vice-president of the Wiltshire Archaeological Society. He gave active support to any project or organization for the good of the town or county. It has been well said of him that his long career is "the record of a man of great integrity, singleness of purpose, and marked ability, which found expression in the many phases of life with which he actively associated himself, which still bear the impress of his sterling character and loyal devotion to duty, and which with his beneficent nature and the old-fashioned courtesy of the typical English gentleman will cause his memory to be long enshrined in the hearts of those who knew him."

Much regret will be felt by a wide circle of friends and patients at the untimely death of Mr. MICHAEL GAFFNEY at Ilkley on March 6. Born at Ballintemple, Co. Cavan, he was educated in Belfast. In 1915 he joined the Dublin Fusiliers and saw service in France. He was decorated with the M.M. and promoted on the field early in 1917, and was mentioned in dispatches. Shortly after he was very severely wounded. On recovery he joined the Royal Flying Corps, and became a pilot until he was demobilized in 1919. He then spent several years in the U.S.A. He took up the study of medicine at the University of Edinburgh in 1926, and graduated M.B., Ch.B. in 1931. Following qualification he became senior clinical assistant in the ear, nose, and throat department of Edinburgh Royal Infirmary For twelve months he was house-surgeon and resident medical officer at the Victoria Hospital, Blackpool. He gained the F.R.C.S.Ed. in 1934, and was appointed resident surgical officer to the ear, nose, and throat department of the Manchester Hospital for Consumption and Diseases of the Throat and Chest. In 1935 he joined a large partnership in Bridlington. He was honorary surgeon to Lloyd's Hospital, Bridlington, and medical officer to St. Anne's Home. In 1940 he joined the staff of the Ministry of Pensions, where he worked until January of this year. "J. Mac." writes: Gaffney brought to the study and practice of medicine that clear thinking, determination, and courage which was so characteristic of his adventurous career in other walks of life. In sport he was a fine boxer, an excellent swimmer, and a golfer of no mean calibre. Always master of the situation, bright and breezy, and with his fine physique radiating energy and cheerfulness, it is hard to believe that this gallant Irishman has passed on.

Dr. E. RANSON BOWEN died recently at Swansea, where he had lived in retirement. From 1905 to 1931 he was a colliery surgeon at Bargoed, Rhymney Valley, Glam., where he was greatly esteemed for his skill and kindliness of heart. A colleague writes: Bowen was a most competent practitioner, and before the time of the Aberbargoed Hospital he had to do any surgical work in the cottages of the miners, and later was one of the visiting surgeons of the local hospital. Soon after qualification he was a ship surgeon for a few years. He often recalled his world travels and kept up a close interest in things generally—a wise mode of relaxation from the exacting and often heavy duties in a colliery practice. We often met in consultation, and this association was always pleasant and stimulating, for his clinical interest never diminished in the course of time. Dr. Bowen was one of the founders of the local division of the B.M.A., and for several years was its honorary secretary. He leaves a widow and two daughters, one of whom is on active service in the W.A.A.F.

News has reached this country of the sudden death on January 15 of Mr. KENNETH MACKENZIE, surgeon to the Auckland Hospital and examiner in gynaecology to the University of New Zealand. He was born in 1885 the eldest son of the late Sir Thomas Mackenzie, High Commissioner for New Zealand in London, and studied medicine at Otago and Edinburgh. He graduated M.B., Ch.B.Ed. in 1908, M.D. in 1911, and M.Ch. in 1913, and also took the F.R.C.S.Eng. diploma. On returning to New Zealand he set up in practice as a consulting surgeon and gynaecologist, and won a high reputation as a teacher. He joined the British Medical Association in 1912, and was chairman of the Auckland Division in 1934.

Medical Notes in Parliament

Inquiry Committee on Medical Schools

In reply to Mr. Jewson, the MINISTER OF HEALTH said that the Secretary of State for Scotland and he had decided to set up a committee, under the chairmanship of Mr. W. M. Goodenough, with the following terms of reference: "Having regard to the statement made by the Minister of Health in the House of Commons on October 9, 1941, indicating the Government's post-war hospital policy, to inquire into the organization of medical schools, particularly in regard to facilities for clinical teaching and research, and to make recommendations."

The following had accepted invitations to serve on the committee: Prof. T. R. Elliott, Dr. A. M. H. Gray, Prof. J. Hendry, Prof. A. V. Hill, Sir Wilson Jameson, Prof. J. R. Learmonth, Sir Ernest Pooley, Sir John Stopford, and Dr. Janet Vaughan.

Ordnance Factory Medical Services

During the debate on production in the House of Commons on March 24 Mr. MESSER referred to the waste in man-power due to ill-health of the workers. He said he had welcomed the introduction of the factory medical service, but he was not sure that we were making the best of our opportunities there. Something more was required than that there should be a small corner of a factory set apart for first-aid purposes. Royal Ordnance Factories employed about 100 medical men. What was needed first in regard to that service was the appointment of a suitable senior officer. At the moment the head of the service was Sir David Munro, who was also secretary of the Industrial Research Board, and, he believed, did other things too. He really could not do the necessary planning if his interests were engaged in so many different ways. He had a good and very efficient deputy who in his absence did the work. But in the absence of that deputy the executive work was done by a woman who was not a doctor, and who, so far as he (Mr. Messer) knew, had no knowledge of industrial medicine. He urged this point because if they did get an efficient medical staff attached to factories, especially ordnance factories, they would be in a position to prevent much illness that resulted from the workers not being advised when they were just out of sorts. What was wanted was a proper medical bay. At Woolwich Arsenal there was in charge a colonel from the Army, a doctor, not a man who had had any previous knowledge of industrial medicine. The staff there had naturally been selected because of their knowledge of industrial medicine, and what was bound to happen was friction between the colonel and his staff. The result was that there had been something like nine resignations and transfers from that important factory within twelve months, and the Government had lost the service of some very valuable people.

Wartime Nurseries

On March 24, Miss HORSBRUGH, replying to Mr. Bossom, said that it was intended that as many war nurseries should be opened as were required in connexion with the employment of women, but it was not possible to say now what number would ultimately be needed. At the end of February, 1,063 were in some stage of preparation, and 322 of these were already in opration.

Replying to further questions, Miss Horsbrugh said that those figures included only those war nurseries for which local authorities got 100% grant. She thought nurseries would shortly be available for the children of women who did part-time work. At present, the nurseries were practically all for those doing full-time work.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* an increase of 156 cases over the preceding week was recorded for measles. The average rise in the number of cases during the past two months has been over 200 a week. During the week reviewed there was a slight fall (98) in the counties of London, Kent, Middlesex, and Surrey, where during the past few weeks substantial increases have been recorded. For Warwickshire, Lancashire, and Northumberland the total was as much as 277 in excess of that of the previous week.

With an increase of 127 in the notifications of pneumonia, the incidence of this disease reaches the highest level for the past twelve months. Over one-quarter of the total cases were reported in the two counties of Lancashire, 170, and Yorks West Riding, 178.

The only noteworthy variations in the incidence of whooping-cough occurred in Kent, Middlesex, and Essex, with rises of 29, 27, and 17 cases respectively. The experience of these counties resulted in an increase of 34 cases in the total for the country.

Although the number of cases of dysentery went up by 11 during the week, there were no fresh outbreaks of any size. In Surrey notifications rose from 10 to 26, and in Middlesex from 8 to 21.

In *Scotland* there was a general rise in the incidence of the common infectious diseases. The largest was that for measles, with 118 more notifications than in the preceding week. The disease was centred in two cities—Edinburgh 171 cases, and Glasgow 106.

In *Eire* 2 cases of typhus were notified in the rural district of Shillelagh, Co. Wicklow.

Quarterly Return of the Registrar-General for Scotland

The returns for the fourth quarter of 1941 put the health of Scotland in a favourable light. The death rate was 12.5 per 1,000, 0.7 below the average for the corresponding quarter for the last five years. The birth rate was 17.0 per 1,000 of the population, or 0.6 above the average for the fourth quarters of 1936-40. Deaths of infants under 1 year were equivalent to an infant mortality of 75 per 1,000 live births and were 5 below the preceding 5-year average. (In this connexion we would draw attention to Prof. Charles McNeil's article in the opening pages of this week's *Journal*.) Maternal mortality at 4.5 per 1,000 live births was 0.5 below the 1936-40 average for this quarter. The death rate from all forms of tuberculosis was 72 per 100,000, and that for respiratory tuberculosis 57. The former was 6 and the latter was 5 higher than the 5-year average.

The quarterly return includes provisional figures for the whole year, which give a more sombre picture. The annual death rate for 1941 was 14.5 per 1,000. This rate, equalled in 1940, was otherwise the highest since 1929. The infant mortality was 83 per 1,000 live births, the highest rate since 1932. The maternal mortality of 4.7 per 1,000 total births was 0.2 above the average of 1936-40. A birth rate of 17.9 per 1,000 was recorded, the highest in Scotland since 1936.

Deaths from all forms of tuberculosis increased. The mortality was 83 per 100,000 in 1941 and was the highest rate for any year since 1932, when it was 84. The death rate from respiratory tuberculosis was 62. Compared with 1940 the number of deaths from respiratory tuberculosis increased by 2.6%, whilst deaths from other forms of tuberculosis increased by 9.5%.

Fewer deaths were recorded in 1941 from epidemic diseases than in 1940, with the exception of whooping-cough, which rose from 197 to 720 deaths.

No. 10

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended March 14.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1942					1941 (Corresponding Week)				
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	230	12	45	2	10	330	19	58	1	14
Deaths		1	3				5	4		
Diphtheria	842	39	198	51	26	1,033	49	265	22	31
Deaths	18	—	3	2	—	31	—	11	1	—
Dysentery	131	15	35		2	146	21	25		1
Deaths		2	—	—	—		—	—	—	—
Encephalitis lethargica, acute	1	1	2	1	—	7	—	2	1	—
Deaths		—	—				2	—		
Enteric (typhoid and paratyphoid) fever						28	—	6	4	1
Deaths						—	—	2	—	—
Erysipelas			42	7	5			46	10	1
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	26	1	9	7	3	36	4	10	4	6
Measles	2,706	198	318	97	22	15,056	315	130	—	23
Deaths	3	—	—	1	—	25	1	2	1	—
Ophthalmia neonatorum	71	4	25	1	—	—	—	13	—	—
Deaths										
Paratyphoid fever	6	—	1	—	—					
Deaths		—	—	—	—					
Pneumonia, influenzal*	1,403	81	19	8	9	1,318	56	43	15	9
Deaths (from influenza)	81	10	7	2	4	132	15	11	2	7
Pneumonia, primary			308	34				506	9	
Deaths		51		19	12		—		23	23
Polio-encephalitis, acute	2	—				2	—			
Deaths		—					—			
Poliomyelitis, acute	3	—	—	—	1	5	—	1	—	—
Deaths			—		—			—		—
Puerperal fever	3	3	24	4	1	—	—	2	5	—
Deaths		—					—			
Puerperal pyrexia	191	6	23		—	141	7	13		1
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,260	52	189	46	20	1,221	60	163	27	24
Deaths	—	—	—	—	—	—	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths	—	—	—	—	—	—	—	—	—	—
Typhoid fever	16	3	5	7	3					
Deaths	—	—	1	1	—					
Typhus fever	—	—	—	2	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,324	162	54	12	37	3,338	55	868	—	23
Deaths	9	2	—	—	—	38	2	21	1	—
Deaths (0–1 year)	391	27	76	32	23	465	37	150	26	35
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	5,823	825	789	266	170	6,134	922	841	269	261
Annual death rate (per 1,000 persons living)			17·8	17·8	†			18·3	17·9	22·9
Live births	5,961	622	958	328	266	5,208	404	859	357	255
Annual rate per 1,000 persons living			19·8	21·9	†			17·4	23·7	22·3
Stillbirths	254	23	41			230	16	28		
Rate per 1,000 total births (including stillborn)			41					32		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

Medical News

The spring meeting of the British Orthopaedic Association will be held in Liverpool on May 29 and 30 under the presidency of Mr. G. R. Girdlestone. The programme will include a discussion on "Delayed Union of Fractures in the Lower Limb," and another on "Methods of Amputation in the Lower Limb—a Comparison of Canadian and British Experience." There will also be a visit to the R.A.F. Rehabilitation Centre at Hoylake. No award of the Robert Jones Medal and Association Prize has been made for 1941.

A meeting of the Tuberculosis Association will be held at 26, Portland Place, W., on Saturday, April 18, at 10.30 a.m., to receive the report of the special subcommittee upon the question of the rehabilitation of the tuberculous in the Ministry of Labour's interim scheme.

A meeting of the Medical Society for the Study of Venereal Diseases will be held at 11, Chandos Street, W., on April 25, when Major S. M. Laird, R.A.M.C., will open a discussion on the need for further powers to deal with sources of infection, contacts, and defaulters. The Section of Physical Medicine of the Royal Society of Medicine has arranged a discussion and demonstration on gonococcal arthritis at the Royal Victoria Hospital, Netley, Hants, in the afternoon of May 16; members of the M.S.S.V.D. are invited to attend the meeting.

Col. J. R. Rees will deliver a lecture on "Psychoneuroses in the Army" at Weston Hotel, Bath, on Thursday, April 9, at 5.30 p.m. All Service medical officers and civilian practitioners will be welcome.

The General Medical Council has amended the *British Pharmacopoeia, 1932*, by modifying the directions for preparing extractum malti (extract of malt) on page 177, line 20, as follows: After "barley, *Hordeum distichon* Linn.," insert "or a mixture of this with not more than 33% of sound malted grain of wheat, *Triticum sativum* Lam."

Dr. Fred W. Rankin of Lexington, Ky., President-elect of the American Medical Association and son-in-law of the late Dr. Charles Mayo, has been appointed chief casualty surgeon of the American Army.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

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TELEGRAPHIC ADDRESSES.—EDITOR, *Aitiology Westcent, London;* SECRETARY, *Mediocra Westcent, London.*

B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Ether Convulsions

Dr. G. BAYNTON FORGE writes: I was very gratified when I read in Sir James Walton's article on war surgery of the abdomen (Feb. 21, p. 247) that he advocated open ether as the anaesthetic of choice. I have watched the mechanical devices with interest but without conviction, and the question arises, Are these contraptions the main contributory cause of these convulsions? It would be most interesting to know from the records of the large London hospitals the number of cases of convulsions before and since the introduction of the "mechanical anaesthetist."

Lotion for Pityriasis

Dr. A. H. PRITCHARD (Whitchurch, Glam.) writes: In reply to Dr. A. R. Kennedy's query (February 28, p. 314) regarding a suitable lotion for the treatment of pityriasis capitis, may I suggest the following: sulphur. praecip. grains xxx, spirit. camphor. ʒj, glycerin. mxxiv, aq. dest. ad ʒj; or an excellent preparation made by Crookes and known as Crookes' collosol hair tonic. The latter preparation contains sulphur and a small quantity of mercury in suitable combination. Two lotions are made, one an oily preparation and the other a watery one. Naturally the latter should be used for an oily pityriasis capitis. Neither of the above lotions will darken the hair in their action. In using either, a suitable amount should be well massaged into the scalp with the tips of the fingers night and morning before brushing the hair. It is pointed out that frequent washing of the hair with ordinary soft soap will greatly help the treatment of an oily pityriasis. I have used this routine and the above lotions in a great many cases with excellent results, but, like most hair complaints, the treatment must be persevered with.

LETTERS, NOTES, ETC.

An Indomitable Patient

Dr. LEWIS SMITH, F.R.C.P., writes from Criccieth: I retired from consulting practice in 1927, but the following extracts from a letter recently received from a patient sent for diagnosis in 1918 impress me as so remarkable a record of a fight through to life and usefulness as to merit publication. It offers a fine example of *vis medicatrix naturae* implemented by medical skill and the "will to win" of an indomitable patient. Such a result affords a grand stimulus to us all—consultants, specialists, practitioners, nurses, and especially to patients—and a reminder of the need for hope and perseverance even in the darkest hours. I hope you may find room for it in your columns.

"It is now 24 years since you put me into a nursing home, told me I had T.B., and later visited me at the sanatorium. You will be interested to know how your old patient has done. At —— I had 39 haemorrhages in 10 months, and after 13 months in bed was pneumothoraxed. The lung was collapsed for 6 years, and in that time I had 64 refills. In 1925 I took a shooting and started stalking, and in 1926 went out to India. . . . It was because I was to be 5 months in India that refills were stopped. I have done a lot of stalking since. . . . I have 1/2 to 5/8 of the diseased lung in operation, but am more breathless than I was, but that I put down to getting older plus the fact that 4 years ago I went through a serious operation that went wrong. I was so sick after the anaesthetic that I burst my interior stitches and now have to wear a belt, as the surgeon won't take the risk of putting me under again. In spite of all I still do some shooting and can play 2 rounds of golf a day. I got married 14 years ago. . . . I travel daily to business, spending 3¼ hours getting to and from the office. . . . I am a dispatch rider in the Home Guard."

Raisins for Sulphapyridine Nausea

Dr. R. H. P. HICK (Bracknell, Berks) writes: As you know, sulphapyridine is invaluable, but has the serious drawback of causing such nausea and vomiting that patients have difficulty in continuing to take it. About two years ago a man aged 45 years contracted pyelitis, and I gave him sulphapyridine. Next day he said that the tablets caused him such nausea and vomiting that he could no longer swallow them. Needless to say, I had not suggested that he might feel sick. I urged him to continue, and next day he exhibited to me a smiling face and said that he had found that if he chewed three or four raisins with the tablets he did not suffer from nausea. Since then I have always prescribed raisins with the tablets, and have never found anyone who had to give up the tablets or resort to parenteral injections right up to two lobar pneumonias last week. It seems to me that this is so valuable a "tip" that I ought to publish it, and so find out the experience of others.

Improvised Dressing for Painful Boil

Dr. C. G. EASTWOOD (Weston-super-Mare) writes: The following improvisation may be of interest to other readers of the *Journal*. I was recently faced with the problem of a large painful boil immediately above the patella, too tender to bear any dressing in contact with it, and the absolute need for continuing up and about my business. In this predicament I found that a pillbox inverted over the boil and held in place with strapping not only enabled me to get about with a minimum of pain, but also gave a mild "cupping" action, greatly aiding free drainage. A later refinement was a cushion of lint fixed round the rim of the pillbox with more strapping, and I can strongly recommend the device in any similar circumstances.

"Liquid Plaster" for Immobilization

Dr. H. S. RUSSELL (Shipley) writes: Dr. S. Galewski (February 14, p. 225) recommends a silicate solution for preparing finger splints. I should like to suggest that he will find a cellulose cement, available commercially as "rawlplug durofix," much more effective, as it dries quickly, sets hard, and is waterproof.

Dr. E. H. REINSBERG wishes to correct the last sentence in his note on the treatment of threadworms (March 7, p. 348). The gentian violet pills were obtained from British Drug Houses, Ltd.

The Cox-Cavendish Electrical Co., Ltd., of 46, Marylebone High Street, W.1, have published an illustrated booklet on the Ediswan electric convulsion therapy apparatus (Grey Walter's specification) for the treatment of mental disorders. Copies will be sent to any registered medical practitioner on application.